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# CUTHILL'S FRUIT AND VEGETABLE MANUAL

# CUTHILL'S

# FRUIT AND VEGETABLE MANUAL.

BY

JAMES CUTHILL, F.R.H.S.

CONTAINING

THE AUTHOR'S TREATISES UPON

MARKET GARDENING.
THE POTATO.
THE CUCUMBER AND MELON.
THE STRAWBERRY.
THE VINE.
THE MUSHROOM.

LONDON:
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1872.

191. k. 79.

# MARKET GARDENING,

OR THE

## VARIOUS METHODS ADOPTED BY GARDENERS

IN GROWING

## FOR THE LONDON MARKETS.

BY

JAMES CUTHILL, F.R.H.S.,
OF CAMBERWELL, LONDON;
*Author of "A Prize Essay on the Potato," "The Cucumber and Melon," The Cultivation of the Mushroom," "A Treatise on the Strawberry," and "A Treatise on the Vine."*

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Fifth Edition.

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5, PATERNOSTER ROW.
1870.

# MARKET GARDENING.

## GENERAL REMARKS.

All admit that London furnishes the finest flowers, fruits, and vegetables in the world; and the reason is, London contains the world's wealth, being the great resort of the aristocracy, and the very centre of commerce. This being the case, market gardeners have always got the highest prices for their goods. This stimulates them to greater exertions to get heavier crops, and those of the finest quality. Manure, the very "gold dust" of high cultivation, with them is cheap and plentiful: without this, the London market gardeners would not be one bit better than those of any other neighbourhood. In addition to this, London being such a large city, the suburbs even, on account of the large number of horses, cows, pigs, &c., which are kept in them, yield great quantities of rich manures; therefore market gardeners so situated get their manure at the cheapest rate. The large competition which exists among growers makes them very quick, and most excellent men of business. They have good selected seed, proper times of sowing and planting, with an enormous quantity of seed-beds always ready. I have seen myself acres of seed-beds of cabbages upon one man's ground, and every one of them planted out by November.

I have lived in what are called the Fulham Fields, which are market grounds; this district lies west of London on the north bank of the Thames, with a very gentle slope to the river, running westward some eight miles, and bounded on the north side by the Brentford or great western road, containing many thousand acres. This is the spot where the finest things are grown in general; but there is a tract of ground, less or more on the Surrey or south side of the Thames, reaching from Camberwell all the way to Richmond, a distance of some ten miles, which is little, if any, inferior. The Surrey market gardeners also produce first-rate things, and were they as close upon London, with no tolls to pay in taking their produce to market, they would match the Fulham growers. Then, again, there is a district between London Bridge and Greenwich called the "Jamaica Level," this is also on the south side of the Thames. This low-lying piece of ground is very rich of itself, having been washed by the Thames, which has left a rich deposit of soil many feet deep—so deep, that the very best Liquorice has been grown there. This part produces very fine strawberries, rhubarb, horse-radish, and the finest seakale of all. These, then, are the principal districts near and around London. Then, further into Kent, "the garden of fruits of England," great quantities and great varieties are grown there for the London markets; for instance, very early peas and asparagus round Gravesend, &c., with enormous crops of fruits of all sorts, spread here and there all over the county. Then we cross the Thames into Essex: there again they produce peas, beans, cabbages, onions, &c., even as far down as Colchester, whence famous early asparagus, &c., is sent to town. In leaving Essex, passing along the northern skirts of the city, touching part of Hertford, the land in general is not so congenial, being mostly clay; here very little, except at Enfield, is produced for the London markets. Then, westward of Brentford, in the districts of Isleworth, Hounslow,* Teddington, &c., the very finest productions are raised. Then Bedfordshire supplies cucumbers by the waggon-load. Turnip-tops come as far off as from Buckingham and Berkshire; besides the enormous quantities of hampers of all sorts of vegetables sent by families, &c., London swallows up everything, with its three millions, and its tens of thousands going in and coming out: still no town in the world is better supplied with fruits, vegetables and flowers.

Some years back, I took the late Mr. Smith, of Deanston, over part of the Fulham gardens; he was perfectly astonished. He looked for big hedges, big ditches, and weeds, but none were to be seen. The grand secret after all is in a nutshell. Continual dunging, trenching, or bastard-trenching (that is, the dung and part of the top mould put in, and one spit afterwards), hoeing whether there are weeds or not, with the best of seed, and attention paid to the proper times of sowing and planting. There is no drawing up of the mould to keep the cabbages, as some suppose, from being blown down. Drawing up the mould is never practised by the best gardeners. Market gardeners know that after an active crop the top soil for several inches deep is entirely exhausted, and hence the reason for continual trenching, in order to bring up the top soil, that but a few months before had been turned down, with a large proportion of dung, to enrich it and fit it for active use along with the half-decayed manure.

Market gardeners keep a great many pigs. Mr.

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* I was not aware of the great extent of market grounds here until I went down with the late Mr. Hume, M.P., to settle about his market-ground estate, near Hounslow.

George Bagley is quite famed for a good breed; he tries to keep his stock up to 100 or more; he has a steaming- or cooking-house for their food. Nothing pays equal to pigs. They grow even faster than vegetables. They eat all sorts of vegetable stems and leaves, and turn everything quickly into manure.

It was one time considered by market gardeners to be beneath their notice to grow flowers, but now they all do so—such as stocks, pinks, picotees, cloves, ranunculuses, anemones, heart's-ease, daisies, auriculas, geraniums, mignonette, polyanthuses, violets, roses, and every saleable blossom of every sort.

Railroads have done wonders. The old market gardeners are astounded at present prices; but they do not suffer so much, since they get everything cheap for their use.

Growers of seeds suffer most, as the Continental cultivators sell theirs so cheap.

We must not overlook the herb grounds round London, which are very interesting. The district where herbs are cultivated is Mitcham, in Surrey, about nine miles south-west of London, where hundreds of acres of all sorts are grown. As the stranger approaches that locality in the summer time, with the wind in the south-west, the combination of odours can easily be discovered in the air, which is "redolent with sweetness." There are hundreds of acres of liquorice, of lavender, and peppermint, for distillation, &c. The cultivation of mint is very easy and simple; it is ploughed-in every winter. This does not destroy the mint-roots; on the contrary, it improves them, as it kills all weeds, and the mint grows up in rows abundantly strong the next year. Liquorice is planted in deep, well-manured ground, eighteen inches row from row, and nine inches plant from plant. When the stems and leaves are in full growth, they look like a plantation of sapling ash trees, growing to the height of four and five feet: these are cut down every year, and the horizontal root, or rhizomes, travel along the surface: these having joints and eyes, are the propagating root. Every one must be forked up every winter. They are sold for sweetening beer, &c.; but they are not near so sweet as the real root, which descends many feet into the ground. The crop is taken up once in four or five years, according to the state of the land. Lavender is a more important crop; this occupies some two or three hundred acres; for this the ground is trench-ploughed. They are planted two feet each way: during the second year, an acre will fetch £20 for distilling purposes. The heads are used for fine oil, the flower stems for rougher oils. The proper time to cut is when the lower blooms are just beginning to turn brown: and after cutting, the sooner it is distilled the better; for if left too long, they lose much of their fragrance. But Mitcham grows all other sorts of herbs: and even the London birds are not forgotten —groundsel, chickweed, and all other things. I saw, in fact, men, women, and children, who had nothing else to talk about but herbs! herbs! herbs!

Then there are the numerous forcing grounds round London in every direction, for forcing every description of fruits and vegetables of the finer sorts, and salads of all sorts, as well as all sorts of sweet herbs, &c., &c.—large mushroom grounds, &c., &c. Everything is grown round London that will "turn a penny."

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## FILBERTS.

Kent has long been famous for Filberts, and every gardener out of that county wonders how it is the only district in England where they are grown so fine. The grand secret of making the Filbert bear is to keep its roots as near the surface as possible, (as all fruit-bearing trees ought to be,) and never to use the spade, but a spud or broad-tined fork, to loosen the surface, as well as in the manuring process.

Filberts regularly pruned, like a well-trained currant-bush, or more like a well-managed hawthorn dean apple, rising to the height of eight or ten feet. The stem is quite clear for, at least, a foot above the roots; no suckers are ever allowed to grow, unless for a fresh plantation. If the plan of rubbing-off the wood buds was adopted in spring, then all the nourishment that supports them would go to its proper use, and do away with cutting so much in pruning. Persons who are about to plant Filberts could easily make the soil to suit them. I have picked as fine nuts, and Filberts, too, on a barren sandy steep bank, facing the south on the banks of the Teith, near Doune, in Perthshire, as ever Kent produced.

As I have not had time to traverse all the Filbert districts, I am indebted to the late Sir Jasper Atkinson, a grower in Kent, for the following information on the subject, which is first rate, and I shall leave him to speak for himself, to the questions which I put to him.

Q. How many acres supposed to be in Kent?

A. Not able precisely to say, but there may be about 5000 of Filberts and Nuts.

Q. What sort of soil do they like best?

A. The soil to make a plantation to last, and be most productive, is stone or rocky soil.

Q. Are they reared from suckers or nuts?

A. From suckers, nuts will not come true.

Q. What sort of manure, and how often?

A. The best manure is rags; they require manuring every year. The earth must be taken from round the stem, remain open all November, then the manure put thickly round, and the earth thrown over the manure.

Q. How pruned, and what time?

A. The pruning should take place in January or February, and the shoots should be cut close.

Q. How far apart, plant from plant?

A. The distance for Nuts is about eight feet, and for the first four or five years, you may plant currants, gooseberries, and vegetables, between them.

Q. Are they planted with any other crops?

A. They may be planted with hops or apples, and, after a certain time, take up those trees which you think the least productive.

Q. How many sorts are planted?

A. Three sorts—Filberts, Cobs, and Spanish; but the Filberts and Cobs are considered the best.

Q. How long does a plantation last?

A. This depends on various circumstances, but if the soil suits, a plantation will last a hundred years.

Q. How long before coming in bearing?

A. They will begin to bear in about three years, and continue increasing according to the growth of the trees.

Q. What weight per acre?

A. The weight very uncertain, depending upon the season, from one cwt. to twenty cwt.; there have been crops equal to thirty cwt. per acre.

Q. Has the Filbert ever been grafted upon a stinted stock?

A. It never was known.

Q. How transmitted to market?

A. In marketing them, they begin to pick the nuts as soon as they get brown, and so continue sending them in sieves, or half-sieves, or any quantity that may be thought proper, according to the demands at market.

Q. How much per cwt. or lb.?

A. From £3 to £5 per cwt.

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## THE STRAWBERRY.

This most delicious and wholesome fruit is very largely cultivated for the London markets; and more fruit is even consumed in the villages surrounding the metropolis than in the largest provincial town in England. It is difficult to discover the correct acreage devoted to this kind of crop in the different counties surrounding London, but, at a rough guess, it may be estimated at near 300 acres.

In cultivating Strawberries, the runners are generally planted out upon well-prepared ground in August, but in the case of dry weather, the operation is often deferred until about the first of September. They cannot, however, be planted out too soon; and for the British Queen, the old-fashioned plan of saving the runners amongst the old plants; or, what is better, pricking them out into winter beds four inches apart, and planting them out in March between lettuce, or some other dwarf crop, answers best.

Some market gardeners plant the British Queen two feet six inches apart between the rows, and eighteen inches plant from plant. By this means large fruit is obtained; and should the autumn prove so dry as to ripen and set the buds properly, the crop in the following year is very heavy. Keen's Seedling does not require such treatment; if it is planted out in July or August it makes fine plants, and bears a heavy crop the first year, but the plantation must consist of runners from plants that have produced a good crop; and the safest plan is to go over them when they are coming into flower, and before they are mulched, in order to pull up any plants that are unproductive. In some years acres are destroyed, on account of their not bearing fruit. This happens after a wet autumn, which causes the plants to grow into leaf without forming flower-buds, and this occurs oftenest on light land. In the Strawberry season, market gardeners provide themselves with thousands of pottles, called quarts; these are formed of white fir, or laths split up very thinly. The length of the London pottle is 11 inches; the inside diameter at the bottom is an inch, but it gradually enlarges until it is three and a half inches wide at the top, which is finished with a handle rising about four inches above the rim. This pottle properly filled with fruit ought to weigh from twelve to fourteen ounces. For the first early Strawberries, what are called pint-pottles are used; these are the same size at the bottom as those just mentioned, but they are only seven inches long, and not quite three inches in diameter at the top, finishing with a handle two inches high. They hold, when filled, about from four to six ounces of fruit. "Punnets" are made of the same material as the pottles; they hold half a pound, one pound, two pounds, and upwards, according to the purposes for which they are wanted.

Considerable skill is exercised in what is termed "topping up of a pottle," so as to give to its top the form of a cone. The first row of fruit sits partly on the rim, and exhibits its best broad side half way round the pottle. The next row occupies the bottom of the last, and so on to the top. The other side of the pottle is then "put up" in the same way, and when well done, the fruit is not easily displaced; the pottles are then sent off to market in light spring vans, which hold two tiers of white wicker baskets, the latter contain thirty-six pottles: but in the case of the best fruit these baskets are divided, by first putting in a layer of one pound punnets and then a division, filling up with punnets. The supply for the shops is conveyed to them by Welsh or Irish women, who carry them on their heads.

As for sorts of strawberries now grown they are too numerous to name. For my plan, see my Strawberry Pamphlet.

## RHUBARB.

The late Mr. Myatt, of Deptford, who was celebrated for his fine Rhubarb, was the first to cultivate it on a large scale. It is now nearly fifty years since he first sent his two sons to the Borough Market with five bunches, of which they could only sell three. Next time they went they took ten bunches with them, which were all sold. Mr. Myatt could even then see that Rhubarb would, in time, become a public favourite; and the result has proved the correctness of his views, for it is now generally used both by rich and poor: it is no longer called "physic," as it was wont to be in bygone days. Rhubarb will grow in almost any soil, provided it is rich; but light land, well manured, will always produce a better-flavoured stalk than a stiff, retentive clay. The usual plan of forcing it about London consists in digging long pits to the depth of two to three feet, introducing eighteen inches of hot dung, and then packing the roots closely together in a little mould, covering the crowns with hoops, or with six inches of straw; then hurdles or mats, and finishing with six or eight inches of straw, the amount of the latter depending on the severity of the winter. In this way strong, well-flavoured stalks are produced, provided the weather is dry. The colour is bright red, and the leaf is always very small. Many prefer forced Rhubarb, on account of its tender fibre. No skinning is required, and it is much less acid than that from the natural ground. Those who desire this kind of Rhubarb, therefore, might easily obtain it by placing about a barrowful of straw over each crown. This covering would be cheap; and, besides bringing it on a little earlier, it would help to manure the ground and keep off frost. Rhubarb growing out of doors is so simple that little can be said respecting it. The ground being heavily manured, a plant is taken up and divided into as many eyes or buds as it possesses. These are planted four feet apart; and by the autumn they will have produced roots from six lbs. to ten lbs. in weight. The oldest roots are generally taken up for forcing; and by always having a good rotation, the grower has the power of continually changing the ground, and thus obtaining a heavier crop. The forced plants will furnish eyes for a continual succession, without growing plants for the purpose; and the eyes may be divided and planted again for a main crop. I have practised this plan on a small scale many years ago.

Mr. George Bagley's plan of forcing Rhubarb with hot-water troughs is very simple, and is thus:—There are a flow and return to each length of wooden pits, or more properly might be called low, wooden spawn-roofed boxes, about ten or twelve feet long, five feet wide, three feet high in the centre, hung on the top by hinges, so that a length upon either side lifts up in order to gather the crop. When the Rhubarb is off, cucumber frames are substituted to grow cucumbers, &c. There are eight rows running parallel, each row about 100 feet long and worked by two fires, each having four rows of pits. I objected to the trough system on account of getting out of order, and I thought three-inch pipes best, in the same way as I have grown my cucumbers for the last twenty years. Mr. B. had tried seakale, but he found it did not answer, on account of having too little moist heat, and he preferred the hot dung. Mr. G. B. is perhaps one of the largest forcers of seakale round London, and one of its best growers. He forces about fifty thousand every winter, and I am quite sure that to him the hot-water system would save a tremendous deal of labour. The hot dung he must have. He said that it was but the expense of a few Irish labourers, which he must employ all the year round.

For a large or small scale hot-water pipes might be laid down for the growth of winter mushrooms, and other early vegetables in spring. The pipes must be parallel to each other and about ten feet between, so as to give room for beds over the pipes, &c. The frames must be all movable, so that they can be taken off and put on at pleasure. For mushrooms, hot-water pipes would answer well, only the heat must be kept low. The beds to be built on the top of the pipes. The bottom heat to be kept to about milk heat.

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## EARLY POTATOES.

These being in great demand in spring, the following plan of producing them has long been practised by the London market gardeners. When potatoes are wanted early, a long bed, five feet wide, is dug out to the depth of two feet. This trench is filled with hot dung, on which six inches deep of the surrounding mould is put. Middle-sized whole Potatoes are used for planting; they are placed in close succession along the bed, covered with two inches of mould, hooped and covered over with mats and straw. In about a month they will have sprouted; frames are then got ready, placing two feet of hot manure along the whole line of framing, which is sometimes 100 yards in length; the mould is put on to the depth of eight inches; the Potatoes are carefully taken up from the striking bed; all shoots are removed except the main one, and they are planted four inches deep. Radishes are then sown thinly over them, covering lightly with mould. When the haulm of the Potato has grown to about six inches in height the points are nipped off: this is done in order to give the radishes fair play, and although it may stop the growth for a few days, still the crop is always excellent. The plants are never moulded up, a plan which weakens the Potato more than anything else. After planting, nothing more is required but to admit plenty of air and give water. The crop is not dug up until it has come to maturity.

The above is the treatment Potatoes receive, but they are also largely grown in hooped beds in the open ground. In the latter case the tubers are sprouted, as I have before mentioned. The beds or ridges are dug out two feet deep in January, filled with hot dung and covering with the surrounding mould to the depth of ten inches. The Potatoes are taken up and planted five inches deep, and above all radishes are sown. The ridges are then hooped over, allowing about two feet of space in the middle, between the mould and the hoop. They are covered with mats and straw, but as soon as the radishes come up, they are uncovered daily, and covered again every night. This is continued till the Potatoes are ready for digging in May; for sometimes large losses are occasioned by a sudden change of weather on cold April nights. Nothing more is done to the hooped beds, beyond attending to them with water. Market gardeners were wont to cut all very large Potatoes for seed, but they are now getting more into the system of keeping the small ones for planting, and sending the large ones to market. The Lapstone Kidney is the best flavoured, most mealy, and productive. It was raised by a shoemaker in Yorkshire.

What are called winter or new Potatoes are the produce of all tubers kept back until July, and then planted. They grow very fast, but the crop never ripens before frost sets in. As soon as the haulm is cut down, large quantities of straw are put on the ground, and towards Christmas the tubers are dug up, put into one-pound and two-pound baskets, and sold for new Potatoes, at from 6d. to 8d. per pound. They are as full of water as a Turnip, on account of the leaves being destroyed before the cells had time to become filled with starch. Cornwall Kidneys are the only ones used for this purpose. On examining one, you will find the skin firmly attached, which is not the case with a new Potato, either grown in frames or in the natural ground. Kidney Potatoes ought to be sprouted before planted. See my Potato Pamphlet.

## ASPARAGUS.

There is but one kind of Asparagus. There can be no doubt that the present plan of saving seed from the strongest plants have much improved Asparagus. Immense quantities of roots are forced on two feet of dung in trenches, having six inches of mould to plant in. These are then hooped over and blanched, to make it look fine and white. The beds are prepared by putting on an immense quantity of manure, and trenching the ground three or four feet deep, mixing the manure as the work proceeds. In March the ground is measured out after the following manner. Suppose that a fence runs south and north, or otherwise: three feet is allowed between it and the first row. A drill is drawn about two inches deep, and the seed is sown thinly, say six inches or a foot apart, which gives choice of drawing out the weakest, in order that the permanent crop may stand one foot apart. The next row is sown eighteen inches from the one just mentioned; then for the alley and two sides of the bed five feet are allowed; then another row of seeds, and so on, which gives two rows to each bed. The first year onions are generally sown all over the ground; the second season lettuce, or any dwarf-growing vegetable that will not choke the Asparagus, and so on until the third year, when the beds are formed out, and a few inches of mould dug out of the valleys and put on the crown; only a few, however, of the finest heads are cut this year. Autumn arrives, and when the haulm is cut, the whole of the ground is forked over, and planted with cabbage, coleworts, or winter greens; then in spring the beds are largely supplied with mould out of the alleys, covering the crowns from eight to ten inches deep. The finishing of the cutting must be left to the grower. A fair crop of heads must be left after four or five weeks' cutting, in order to grow the young buds for the next year's growth, and to restore to the roots what has been taken from them in the shape of a crop; but not one head must be allowed to grow until you leave off cutting entirely at the end of the fourth year. When the haulm gets ripe, it is all cut down, and the mould thrown into alleys and there enriched, and the whole of the beds and alleys are planted again with cabbages, greens, &c. I am proud to say that the grower is now allowing the Asparagus to get greener and more eatable. Mr. George Bagley has got twenty acres, as fine as I ever saw.

## SEAKALE.

This is one of the most delicious of all vegetables. Market gardeners, in preparing it for market, seldom or never leave their roots in the ground where they grow. They are all taken up and put into cold frames or hooped beds. If any are left in the ground, the heads are covered with the surrounding mould to blanch them; and where the soil is not too heavy, this cheap and efficient and sweetest way of blanching might be carried out upon a large scale, even to the extent of fields of Seakale; but even upon a large scale, the market plan is by far the best, as the roots are so easily propagated by the thongs, or smaller branching roots.

In its wild state, Seakale is found on the south-western coast of England. There is one fine natural plantation of it at Calshot Castle, about three miles from Southampton. This Seakale Cape may measure three acres. It is fed with nothing but sea-water by irrigation, as there is nothing for it to grow in but sand and shingles—not a bit of mould at all. The celebrated Dr. Lettsom, upon a visit there, found the village people covering the heads over with sea-weed to blanch it a little. The Doctor found it made a capital dish, and he was the first to bring it to London. He made a present of some roots to the Chelsea Physic Gardens, as well as planted some in his garden at Camberwell—this is some seventy or eighty years ago.

A dish of Seakale consists of twelve heads; and when properly grown, and fit for table, it ought to be a beautiful white colour from bottom to top. It is slowly grown, and very strong, the outside leaves at the base are at least two inches broad, and about a quarter of an inch thick, hardly showing the flower stem in the centre, and from eight to nine inches long. Seakale, like asparagus, could be much improved if persons would save seed from the finest and best plants, and then propagate from the roots of that sort, as the market gardeners now do.

The market plan of propagation is this—at taking-up time, all the thongs or smaller roots are cut off before the plants are put into force. They are laid in heaps under straw during the winter. In February they are spread out on beds made on purpose, then covered with mould an inch or so thick. When sprouted it is seen which is the bottom and which is the top. The ground having been prepared for transplanting, they are then lifted out of the beds, and all but one eye cut out; they are then planted from twelve to fifteen inches apart in the row, and eighteen inches row from row. The ground is then kept clean, and nothing more is done until taking-up time, when forcing commences. Then all the frames are removed where cucumbers grew during the summer, the old dung taken out; the trenches, which are two feet deep, are again filled with hot dung, and mould to the depth of eight or nine inches is then put on the dung. The Seakale roots are dug up and prepared after the following manner: the thongs, or next year's sets, are all cut off; all the small buds round the main eye are pared off with a sharp knife. This is a capital plan, as these inferior eyes only weaken the main crown.

When planting is commenced a furrow is cut out across the bed with a spade, and the roots are put in as thickly as possible. A five-feet bed across will hold from twenty-five to thirty roots. The next furrow is cut out about four or five inches from the last, and so on till the bed is finished. Many of these beds I have seen fifty yards long. From four to six inches of short straw is put on the crowns. The beds are hooped over and covered with a single mat, then straw on the top of all, and in this way I have been told by one cultivator that he grows about 50,000 every winter. Such is the way in which this most delicious vegetable is grown by our London men, who thus bring it on slowly, excluding air by the above simple means.

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# CABBAGES.

These being general favourites with the public, their cultivation is extensively carried out by market gardeners. Seed for the general crop of Spring Cabbages is sown between the 25th of August and the 1st of September, in beds five feet wide, which collectively occupy several acres. When the plants are up hoers are sent over the beds with three-inch hoes; the plants are thinned out, and at the same time all deformed ones are removed. No particular time is set apart for transplanting; this entirely depends upon the season, and how other crops are got off the grounds. Last year Cabbage-planting commenced about the 25th of October; the plants were then very large, and as the ground is dunged and trenched the planters follow the trenchers. I have frequently seen as many as thirty workmen upon one piece of ground, with their foreman walking along the line, in order to see that "every man did his duty," and it is his place to move the measuring sticks; for every man had his twelve feet measured out for him down the whole piece. The spades in use in market gardens are twelve inches long by ten inches broad, and the work is performed by them in a masterly style. Land for Cabbages is heavily manured; a two-horse load is emptied down (as if it were a barrowful) for every thirty feet square. As soon as a four- or five-acre piece of ground is ready for planting, men with lines are put to work on it. I may mention that the existence of slugs is almost unknown in well-managed market gardens; their disappearance is owing to the double trenching which is continually kept up in such gardens. Immediately after planting, hoes are sent through, to

## CELERY.

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loosen the ground, and at all other favorable opportunities during winter and spring the earth is stirred and aerated; but the plants are never moulded up —a bad practice for almost any crop. Under the above system of treatment most delicious Cabbages are produced.

## CAULIFLOWERS.

The seed of spring Cauliflowers is generally sown about the 20th of September in open beds. Towards November, when the weather is beginning to get cold, frames and hooped beds are got ready in light, rich land. The plants are pricked out, not more than four inches apart each way. During the winter they are kept dry; no rain is allowed to fall upon them; but whenever practicable, plenty of air is given to them. Frost has but little effect on them under hoops; but when excluded long from air, and kept in darkness, they sometimes suffer from damp to a considerable extent. They are planted out in the richest and earliest ground in February or the beginning of March. I have known one grower to save nearly all his Cauliflowers for seed, instead of sending them to market. In this way he has secured nearly a ton of seed from large plantations of many thousands. When the Cauliflower is permitted to seed, the whole of the centre portion or flower is cut out, except a rim to run up for seed. If this is not done the mass of flower is so great that, unless a very fine season occurs, the seed will not ripen. The Walcheren is now generally sown for hand lights.

## CELERY.

For the first crop this is sown early in February; and in March and April for late crops. The first is sown either in a frame or under a hooped roof, with hot dung under it. Celery generally succeeds cauliflowers, cabbages, or lettuces. The system is to dig out a trench, two spades deep, banking the mould up on either side, then to fill in a foot of the strongest manure, such as cow-dung, and to cover this with three or four inches of mould for planting in; if the ground is very rich half the quantity of manure is applied. The rows are generally from four to six feet apart. The plants are then taken from the seed bed, and planted root and head entire—not trimmed in, a plan which ought to be discontinued in everything. The plants are placed about eight inches apart, the intermediate ground being planted with coleworts, lettuce, or any other light crops, which are likely to be off before the celery wants moulding up; but market gardeners do not commence blanching until the plants are about eighteen inches high, as it prevents rain and air from acting on the roots. The operation of earthing up is all performed by the spade, no hand-earthing is employed. Parallel lines are stretched on either side of the row, eighteen inches from the plants, and the mould is cut out of the alleys to form the blanching ridge. Late earthing up is effected in about three different times.

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## BRUSSELS SPROUTS.

These are not sown until May; but it should be March. The Scotch sow them in August. Sown in May it is impossible for the plants to get tall, stout, and cover the stems so well with fine, large, close Sprouts, as when sown in March. I have had them three feet high, covered from top to bottom, each stem producing one peck of large, close Sprouts. Brussels Sprouts are always dear, and the poor and middle classes hardly know what they are. Their cultivation is very simple: sow in beds and transplant when the plants are four or five inches high. Select, if possible, a rich, stiff loam for them: plant eighteen inches plant from plant, and two feet row from row: keep the ground well loosened with the hoe. Moulding up the stems is never practised. And as soon as the plants reach their height, which is known by the top beginning to cabbage, *the latter ought to be cut out.* This throws all the strength into the sprouts down the stem, making the bottom ones as good as those on the top. I am well aware that the present plan of producing them does not pay the grower, even at the high prices obtained for them; but that is his own fault: and if some good farming gardeners, who cultivate the land well, would take to growing this vegetable, even if it were but to feed cattle with, it would answer their purpose. It is perfectly hardy: it does not rot, like drumhead cabbage and savoys, and an immense acreage of it might be obtained.

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## CARROTS.

The Early Horn is the only kind employed. It is sown in frames and hooped beds in November and January. The plants are thinned out to four inches apart. Long Carrots for winter use are grown largely in the red sandy soil in the lower parts of Surrey, as well as in Bedfordshire, &c. Long ones do not thrive near London.

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## SCARLET RUNNERS.

These are very often sown amongst Lettuces, six feet apart, about the 1st of April; but by far the best plan is to sow in beds thickly, and transplant by means of the dibber. No plant lifts better, and the moving makes them show flower much sooner. The usual practice is to take the heads off all the plants, leaving them a foot high, and to keep topping all the summer, which induces them to bear heavy crops; but the way of getting them to bear earliest, is to save the roots in autumn, pack them away like dahlia roots, and to transplant them again in March, six inches root from root, in rows five feet apart. It should be borne in mind, that if Beans are left to ripen, the roots will not be near so strong as they otherwise would be.

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## FRENCH BEANS.

The best are the Negro, on account of the Beans being all green, and not marked or blotched like some others. They are also all one breadth, very narrow, and handsome; and they are very dwarf, and first-rate bearers. They are generally sown amongst lettuces, cauliflowers, &c., to succeed the standing crop; but the best way is to give them a piece of ground to themselves. The French Bean transplants nearly as well as the scarlet runner; therefore it might be treated in the same manner; they would also come in much earlier, and grow less robust. The crop would not be quite so heavy; but earliness is everything for the London market.

## EARLY PEAS.

These are sown in rows in December on borders under walls, and by the sides of hedges, three feet six inches apart. Cabbages, or white cos lettuces, pricked out of the frames, or from under the hoops, where they are becoming crowded, are planted between the rows. The Peas are never staked up. The sorts used are the Early Frame and Bishop's and Groom's Dwarf. Peas, however, do not now pay the London growers: they are, therefore, largely grown in Kent, Essex, Surrey, and Bedford, where the ground is equally early and cheaper.

## BEANS.

The Early Mazagan and Early Lond-pod are grown upon warm borders in rows two feet six inches apart, with some other crop between the rows. The only care they require is taking their heads off after the plants show a fair quantity of blossom. This concentrates the sap, and makes them a week earlier. The main crop of Beans is obtained from the counties above mentioned.

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## BEET ROOT.

This is in great demand during winter. Growers are very particular about the time of sowing it, for one week too soon soon spoils it. It is generally put in about the first week in May; but even with the same seed and same soil it makes a great difference if it is transplanted, because in removing the seedings, all forked ones are thrown away. In this operation great care must be taken that the points of the roots are not broken off. Beet is generally planted out about a foot apart each way. It is wintered in large sheds, stored in moderately damp mould, and banked up with straw. It is a mistake to pack it up in dry sand or earth for the winter, and the same may be said in regard to Carrots, Parsnips, Salsify, Scorzonera, and similar roots. Dark-coloured Beets are most esteemed, and they are mnch richer and better than the pale kinds.

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## SPINACH.

The prickled is sown from the 12th of August to the 1st of September. It succeeds whatever crop is removed at the time. It is sown in beds five feet wide. It grows best and finest upon light deep land, on which it is less liable to canker. New Zealand Spinach is not grown for market, neither are the silver beet leaves, both of which are most useful, and are much used by the French, who are also fond of Orache, a capital substitute for Spinach.

## WINTER RADISHES.

These are sown from the first to the last week in December, choosing as warm ground for the purpose as possible; but acres of them may be seen in very exposed places. The ground being prepared, the seed is sown broadcast. The alleys are marked out, and the mould from them is thrown over the seed: a wooden rake is then used to make all level: no iron rakes are employed in market gardens. After sowing, straw, which has been previously shaken out of the London stable manure, is put over the beds two or three inches in thickness. When the plants come up, which depends upon the winter, the straw is removed every day, and put on every night until all danger from frost is passed; it takes five degrees to hurt a Radish after it is half-grown. When off, the ground is again dug for French beans, or vegetable marrows, &c.

## HORSE-RADISH.

The root is like that of Seakale, as respects propagation; the whole roots are thickly studded over with eyes, and in order to make a new plantation all that is needed is to plant small pieces of them, or the tops cut off, in the bottom of a trench, one foot apart each way, and about fifteen inches deep. Horse-Radish is generally planted in February. When it comes up, all the weakest shoots are pulled up, leaving only one; and should any more make their appearance afterwards, they are destroyed by the hoe. When taking-up time arrives in autumn they are trenched up, cutting them down to about a foot or more. They are knifed after the mould is moved. The roots are sorted into best and second best. The best are tied into bundles of twelve heads or more for market; the ground is then well manured with rotten cow-dung, and the roots are again left to come up for another year's crop. The best ground for Horse-Radish is the "Jamaica Level," between London-bridge and Greenwich, and some parts of Battersea, where the river Thames, in days of yore, had thrown up a deep deposit. This ground also produces the best Seakale; hot ground or clay renders it hard and indigestible.

## RIDGE CUCUMBERS.

I have seen fourteen acres of these in one man's ground; they are grown under glass, and hardened off, and planted out six feet asunder, and ten feet row from row; hand glasses are put over them. When they begin to grow the ground is well mulched with straw, to keep the earth moist and the fruit clean. Gherkins are sown in the open air at once, in well-prepared ground, at the above distances; and I have known one party to cut in one day 200,000 fruit, which were all bespoke by oil merchants. Ever since the commencement of the potato disease, however, Cucumbers will not grow round London. See my plan in Potato Pamphlet.

## WHITE COS LETTUCE.

This variety is grown by millions, and is highly esteemed by everybody. The seed is sown from the 10th to the middle of October, in frames, which are filled with soil to within six inches of the top, giving a slope of one foot in four, the length of the lights, which always face the south. As soon as the seeds are sown the sashes are removed, and a man is placed in this department to keep off the sparrows, give air, and shut up in case of rain; the great secret being to keep them as dry as possible, and to let them have all the air they can get. They are planted out in February, or early in March, in rich, well-trenched ground (after celery), one foot apart each way. Gentlemen's gardeners buy the same seed, but, owing to their mismanagement during winter, and the poor state of the ground, they cannot grow such fine Lettuce as the market gardener. Some of the latter are, however, too greedy in regard to crops; for instance, they have often three crops in the ground, all coming forward one after the other; but the best cultivators do not do this; it tramples the ground, and does not give any crop fair play. The rapid growth of a Lettuce depends much upon hoeing or stirring the soil. When well-grown no tying is required; but badly managed plants havé to be tied up a fortnight before they are sent to market.

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## LEEKS.

These are sown in February or early in March, in rich ground. When the plants are strong, and about ten inches high, they are planted or dropped into holes eight inches deep, made by the dibber. After they are planted hoes are sent through them to loosen the ground. In this operation mould drops down upon the roots, and the next hoeing fills the holes up loosely, which is what is wanted, for the soil must not be pressed tightly round the stem, as that would prevent its thickening.

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## BROCCOLI.

These are sown in May; they are planted after a crop of lettuces, radish, or any of the early crops which happen to be cleared off the land at the time. The only formidable enemy to Broccoli is clubbing; they are, therefore, sown in the richest land, and far more are raised than are wanted. If any club, therefore, they are thrown away at transplanting time;

they never make good plants afterwards. I have seen an acre planted upon a deep rich soil, and another acre on hungry, gravelly soil, the plants being from the same beds; the latter were almost wholly worthless on account of clubbing, while the former all escaped.

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## EARLY TURNIPS.

The Early Stone or Dutch being in great demand in spring, various ways of producing it are practised, such as growing it in frames; but the best plan is to raise it like potatoes, in hooped beds, *i. e.* in trenches dug out and filled with two feet of hot dung. Sow in February, hoop and cover with straw, and expose the plant daily. The quality of a Turnip depends much upon quick growth and plenty of moisture. Late Turnips are not cultivated upon the dear land about London; they generally come from ten to twelve miles off. The reason why a farmer cannot raise Turnips like a gardener is owing to the poverty of the land; so small a seed wants immediate and available nourishment the moment it vegetates. It is then able to grow away from the fly, and if the seed is mixed with the Irish peat charcoal it would greatly assist in effecting this.

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## ONIONS.

The ground for the main crop is dressed with strong dung, such as night-soil or cow-manure. The seed for this crop is sown in February or the 1st of March, in beds five feet wide, the soil from the alleys being thrown on to cover the seed. The beds are then raked, and a light, wooden roller passed over them. When up, small two-inch hoes are sent through them, which is all the labour they receive, the ground being so clear of insects, owing to its being often turned over. Market gardeners seldom fail to obtain a good crop of Onions. Where insects occur, however, a good dose of salt and soot sown with the crop will kill them. Another way of managing Onions is to sow about the middle of August, to allow them to stand in beds all the winter, and to plant them out on well-prepared land four inches apart in the rows, and six inches row from row. A third plan is to save all the smallest bulbs, and plant them out in February, the same distance apart as the last.

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## GLOBE ARTICHOKES.

These require very rich, deep land: when planted, they are thinned out to three or four plants in each stool every spring. They are well supplied with manure every winter. I have seen an acre which had not been fresh planted these ten years. A famous plan where the land is stiff and clayey is to dig out a trench eighteen inches deep, and fill it up with a mixture of dung and mould, and in spring to plant out on this mixture. I have practised this system with Asparagus, taking out a spit and filling in the furrows with dung and mould, and planting out in April.

## JERUSALEM ARTICHOKES.

This is a fine vegetable, although not in good repute with many. Cooks tell us it must be boiled in milk, have butter sauce, &c.; but all this spoils it. Cook the tubers, when peeled, just like potatoes; then you have the true flavour. I have also proved to those of confined habits in their body, that there is no equal to it in the whole vegetable culinary department. I have also cut off the tops during the summer; they make a most excellent dish, with the flavour of the roots in it. Plant the tubers from November till March, in rich soil, the same distance as potatoes, if a fine crop is desired.

## PARSNIPS.

These are sown in drills, from twelve to eighteen inches row from row, in March. When up, they are thinned out to a foot apart in the row. A Parsnip ought never to be lifted till wanted; it then boils tender, and is most delicious.

## PARSLEY.

The main winter crop is sown in April and May, and thinned out to six inches asunder, and a foot apart in the row. In picking, all the large or oldest portions are removed first; the head is never cut oft at once; but not one bit is allowed to pass perfection. Parsley pays well for the attention it receives.

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## MUSHROOMS.

These are much sought after in Covent Garden Market, where their annual sale amounts to several thousand pottles, each pottle weighing a pound. Mushroom beds are made after the following manner. As the stable manure is brought home from the London stables, the short material is shaken out of it, and the long strawy part is kept for the purpose of covering, as well as for forming the interior of ridges, for all Mushroom beds out of doors are made into ridges. The manure is not allowed to heat before it is put into the beds, if that can be prevented; for previously heated material does not produce so fine Mushrooms. The fresher the horse-dung is, the longer will the crop last; and every gardener who makes up beds with unheated droppings knows how superior they are to fermented manure. If this is properly attended to, it does not signify what kind of mould is used for surfacing the bed with. Market gardeners obtain enormous crops from ridges covered with common, light, well-enriched mould. When the interior temperature of the ridge gets down to eighty degrees, it is spawned with pieces about two inches square, placed about a foot square; the bed is then moulded over two inches thick, pressed with the feet, and afterwards beaten with the spade. It is then watered, and beaten again with the spade, and smoothed down. The more the mould is pressed, the finer the crop is, and the more solid the texture of the Mushroom. This and green or unheated manure constitute the two grand secrets in Mushroom growing. Mushroom beds made up in this way want but little watering; and when they are watered, it ought to be with liquid manure. The ridges are covered with straw and mats. Such ridges as these are continually being made; and when well formed, they last from two to three months in good bearing. I believe I am correct in stating that there are about ten acres of ground round London continually under Mushrooms, which are all wanted for the various metropolitan markets. See my Mushroom Pamphlet.

## MULCHING.

Summer covering, or mulching, with stable litter, is extensively practised by many of the first-rate market gardeners, not only in the case of strawberries, but also in that of plantations of gooseberry and currant trees, as well as in some orchards. This mulching not only keeps all fruit clean, but it has many other advantages. For instance, it maintains the surface of the earth in a moist state, thereby preserving all top fibres; and, in addition to keeping down weeds, when dug in, it enriches the ground. Unfortunately, if this covering or mulching was practised in private kitchen gardens, it would be considered slovenly. Nevertheless, it is my opinion that, during summer, all crops ought to have a good mulching. This would greatly assist hungry gardens in which a necessary quantity of manure is not allowed.

## GATHERING.

All fruits and vegetables ought to be cut and gathered before eleven in the morning during summer. No fruit or vegetable can have its true flavour if this is not attended to.

## WATERCRESSES.

When the late Sir Joseph Banks came home from circumnavigating the globe, among the first things he asked for, were Watercresses, so highly did he value them as a purifier of the blood, and so important did he consider them in this, as well as in other respects, relating to the animal economy, that he presented one of our Watercress growers for Covent Garden with a Banksian medal, in order to encourage him in carrying out their cultivation. I am sorry to state, however, that notwithstanding this, and although the plant is a native of Britain, and therefore easily cultivated, it is not half so extensively grown as it should be, there being only about four or five producers of it for the

London markets, the main supplies for which are obtained from Springhead, Gravesend, Kent; Waltham Abbey, Essex; and from two or three places in Hertfordshire. The Gravesend and Waltham Abbey Cress grounds are far the best, more attention being paid in these than in the other places to its cultivation; this is apparent in the robust and healthy appearance of the stem, as well as in the leaf, which is broad and has a brownish-green aspect.

I consider that no gentleman's establishment is perfect without its Watercress plantation. There is hardly a park which cannot boast of one of those crystal streams for which our country is famous, and a small piece could easily be enclosed and protected from cattle for cresses.

Since writing the above, the idea struck me that Watercresses might be cooked like the tops of radishes, and that they would make a useful addition to our delicate culinary vegetables. I therefore tried the experiment. The first time I cooked the stems and leaves together. They required but a few minutes' boiling, but the leaves were done long before the stems. The second time I had the leaves only, with a small proportion of the top stem, boiled in a little salt, and the result was a very delicate dish; but like spinach, it takes a good basketful to make one. For invalids and impaired constitutions, I am of opinion that it will prove a first-rate vegetable.

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# IRISH PEAT CHARCOAL.

I have grown all sorts of plants in the Irish Peat Charcoal with the greatest advantage.

In sweetening cesspools, and other unavoidable nuisances, peat charcoal, finely powdered, will be found universally useful. I say finely powdered, because the more intimately it is mixed with the material to be disinfected, the greater will be its power. One pound of charred peat takes one pound and three quarters of water to saturate it, and hence, in addition to its sweetening qualities, it possesses great value in giving night-soil mixed with urine such a consistency as to render it capable of being transferred from our large cities, where it is not wanted, to our rural districts, where it is wanted. In this way "a plague may be turned into a profit."

As we find the charred peat to be so splendid a manure, and without an end, covering, as it does, three millions of acres, from fifteen to thirty-five feet deep, and lying just at our hand, and in a distressed part of the three kingdoms, where industry only wants stirring up (for in England the Irish are the most industrious, hard-working people on the face of the earth, as shown in the former part of this pamphlet), by using this manure largely, you will not only be enriching your own ground, but be lending a helping hand to poor Ireland, where Providence has placed the peat as a blessing; but the uses of the material were not to be discovered till wanted. It is now in a ripe state. The earth wants more manure, and a greater demand is made upon it, which will increase as the population multiplies.

Since the above was written, some years ago, I am much more in favour with charred peat, from the great number of gentlemen calling upon me from all parts of the country, who have tested the peat upon every soil. They have found it most excellent in cow-houses, piggeries, and, mixed with manures of all sorts, not only as a deodorizer and fixer of the salts, but also in taking up the urinal liquid, which is well known to be the richest of manures.

Some day, sooner or later, charred peat will be the means of taking up all the salts and solids out of the sewerage waters of London and other towns. If the simple plan which I have invented was carried out at the terminus of the large sewer on the banks of the Thames, with regard to the sewerage and charred peat, burnt clay, the charred tan, and other rich wastes of Bermondsey, I think no one could deny that this manure, made according to my plan, would be, if not the best, a manure at least unequalled by any British manure now in use. I do not presume to put a price upon this portable and rich manure; but would it not far surpass the Norwood Scented Guano Loam, which I discovered and exposed in the 'Gardeners' Chronicle' years ago, and which was sold at £7 10s. per ton? Surely then my mixture would be worth £5 per ton, saying nothing of the blessing to the health of the mighty mass of people of the largest and richest metropolis in the world.

I have recommended charred peat to be kept in all hospitals, workhouses, slaughter-houses, and wherever there are large accumulations of putrid or decaying substances. I consider that the hospital and workhouse, on account of the numerous diseases and deaths, ought above all places to have charred peat to fill up the coffins of the dead. The thing is very simple. Just put into the coffin about two or three inches of peat, then the corpse, and fill up with peat. This I have done myself, and proved it to be a complete preventive of smells. I may here state that had it not been for a letter of mine to Mr. Smith, of Deanston, many years ago (which was afterwards published), charred peat would perhaps not have been discovered even now.

The health of large towns depends much upon pure water and plenty of it, thorough drainage, and water-closets in every house, large and small. Smoke and soot are decided enemies to the living, as well as to buildings and their furniture. Above all things, do not let us any longer make a common sewer of Old Father Thames, where the filth of at least five millions of animals is daily pouring into this once-crystal water; while these manures, by the aid of the steam-boats and the tide together, make the Thames look more like churned milk, and where millions of unnatural animalculæ are being developed. It is but a breeding hotbed of disease, filth, and vermin. Can any one wonder, as autumn approaches, with a scanty supply of water in the river as well as in the sewers, that disease of the most deadly form is generated by a powerful hot sun? Why should this state of things longer exist, much of which is in the power of man to avert?

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## MIGNONETTE.

Mignonette for spring cutting is largely grown. It is sown in frames in July, and thinned out, and kept very dry, and no frost allowed. By this simple plan, London is well supplied with this fragrant flower. Tree Mignonette is made by tying it up a stick with a single stem any height. All the blossom must be picked off during summer.

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## VIOLETS.

The best plan of growing winter and spring Russian Violets, is by making the ground in ridges, and planting both side: these ridges kept them dry, and bring the flowers early without the risk of damping, and the flowers are much higher scented.

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## IS MARKET GARDENING PROFITABLE?

To this question only an approximating answer can be given, owing to the difficulty of getting at the truth of the matter. An acre of early cabbages on the best land, eighteen inches apart, in rows twenty inches asunder, would contain about 17,000 plants, which, if all sold at 1d. each (and good early cabbages fetch more than that), would realise about £70; but, then, more or less of them would fetch a much lower sum, and therefore we must descend in our scale of prices. The above number, at 9d. per dozen, would fetch about £50; at 6d. per dozen, about £35; and, at 3d. per dozen, about £18. An acre of early white cos lettuces, grown after celery, upon the richest land, a foot apart each way, would realise 1s. per score of 22 to the score, and, if all sold at the above price, the aggregate sum would be £90; but, like the cabbages, many are sold for much lower prices. Then, after cabbage or lettuce, take celery. Some plant this in rows four feet distant, while others place them five and six feet apart; and if large fine heads are desired, the plants ought to be ten inches asunder in the rows. Say 8000 plants to an acre; this number, at 1d. each, would fetch about £35, but, like other crops, if early and fine, they fetch 15d. and 18d. per dozen; and there is also an intermediate crop of lettuces or coleworts to come off before the celery wants moulding up. This intermediate crop will fetch about £5, so that the average receipts of an acre may be set at £90.

The expenses involved in the production of cabbage and celery crops, which occupy the acre nearly fifteen months, are as follows:—Trenching an acre, about £2 10s.; 30 loads of manure, at 7s. 6d. each, say £12; dunging the trenches for celery, say £6; planting the crops, 25s.; seeds of various things, 10s.; hoeing several times, £2 10s.; rent, £9; tithes, 10s.; clearing off the several crops, say £4; washing and packing of produce, moulding up celery, &c., £4; horses, waggons, carts, carters, market fees, &c., about £3 10s. Total, about £45.

I am acquainted with a garden which contains sixty acres of choice fruit trees, whose blossoms were all destroyed by frost during three consecutive years. Now, on these sixty acres the same expenses are incurred every year, whether they bring forth fruit or not; so that taking this loss—that of broccoli from frost—and other things into consideration, the profits of the market gardener are not so large as at first sight they would appear. No doubt, in favourable seasons, they make a considerable sum of money, but, owing to the vicissitudes of climate, the introduction of duty-free foreign productions, and the fluctuation of prices, this desideratum is, at least, rendered very precarious. We have few instances, indeed, on record of market gardeners becoming rich. By means of perseverance and great industry, however, they manage to live comfortably, and effect much good in the country, by spending large sums of money in labour; but as I have just shown, the profits of the occupation are small.

## COOKING POTATOES, &c.

It is a well-known fact, that owing to the inherent nature of the Potato to grow, it leaves the tuber soft and spongy, losing much of its water; and no vegetable can cook well if the vessels have not their natural supply. All water contains air, and as soon as this moisture comes to the boiling-point, it swells and bursts the tissue, destroying all the fibre, swelling the starch, &c. Therefore all Potatoes after April ought to be peeled and steeped in water, ten or twelve hours before cooking. And in towns Peas are much improved by steeping several hours before shelling. The steeping is a first-rate plan for all things long gathered.

A quart of Peas sown in a shallow box, fifteen inches wide by eighteen inches long, at any time of the year, and cut off when about four or five inches high, and boiled like spinach, with a little salt, makes a most delicious dish. The tops of Jerusalem artichokes, cut off about six inches long, and boiled like other greens, make a capital dish, which partakes, in some degree, of the flavour of the root.

The proper way to shell peas is to always have the end where it comes off the haulm turned to your wrist; if this is not attended to, the Peas are forced off unnaturally, and sometimes squeezed and damaged, and get full of water. A trial will soon convince. Never open them from the back, as that is worse still.

## HUMANE WAY OF KILLING SPARROWS.

The annoyance experienced from sparrows eating up valuable things in all gardens round large towns is every year getting worse. I used to buy the powder of the nut or berry of Nux Vomica, but finding this ineffectual, I procured the nut entire at the chemist's. Two ounces of it should be stewed gently in a pint of water for twelve hours; pour this liquid off and save it; then cut the nuts very small (as by this time they will be very soft), again put the nuts into stew, with an addition of half a pint of water; stew gently for six hours, then add the former liquid to this and half a pint of wheat; keep it at a gentle heat until the wheat absorbs all the liquid. Two grains thus pickled will kill a sparrow on a frosty morning at once, and it is a very humane way of effecting that object.

## EARWIGS.

Earwigs are the greatest vegetarians we have. They are fond of everything, even down to the rough leaf of a Marrow about town; and quite as cunning as an old, grey-headed London sparrow. When I grew dahlias my only remedy was to go round with a large basin of boiling water, at about ten o'clock at night, and shake each blossom. Upon the smallest touch, the insect dropped; for although they have wings, they never attempt to fly when disturbed. Flower-pots with dry hay, bean-stalks along peach walls—any hollow tubes, they go into.

* * *

## CONCLUDING REMARKS.

I have endeavoured to ascertain the number of acres under cultivation for the supply of the various London markets, and the result of the inquiry is, that about 12,000 acres are occupied by vegetables, and about 5000 by fruit trees. These lay chiefly in the counties of Middlesex, Essex, Hertford, and Bedford, on the north side of the Thames; and Kent and Surrey, on the south side; and some 35,000 people are employed on them. But this is not taking into account those more distant counties which, by fits and starts, send up the produce of acres of turnip-tops, cabbages, peas, and other things; while hundreds of acres in Cornwall and Devonshire are employed in growing early potatoes, broccoli, peas, &c., which reach London by rail.

In writing I have endeavoured, as far as possible, to steer clear of mentioning names of vegetables, knowing well the labyrinth into which such subjects would lead me; for their aliases are endless. Besides, what will suit one soil will not suit another, and the march of improvement is so rapid that sorts highly valued to-day will be thought less of to-morrow, and will ultimately disappear altogether, to make room for more valuable kinds.

Whatever fruit, flower, or vegetable a market gardener takes to grow, he never fails in producing a first-rate thing. No doubt this is owing much to having his whole mind directed to it. He has none of those crosses of a private gardener, such as pleasing cooks, housekeepers, butlers, and bailiffs.

The reader will have thus seen how the market gardeners round London produce, in the most easy, simple, and natural way, all those exuberant and luxuriant specimens of the finest vegetables which the skill of man and the earth can produce, and which are to be seen every day in Covent Garden Market.

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# PRACTICAL INSTRUCTIONS

FOR THE

# CULTIVATION OF THE POTATO;

ALSO

INSTRUCTIONS ON THE MANAGEMENT OF

ASPARAGUS, SEA-KALE, RHUBARB,
CHICORY AS A SALAD, TOMATO, CELERY,
LIQUORICE,
RHUBARB WINE AND PRESERVE.

BY

JAMES CUTHILL, F.R.H.S.,
CAMBERWELL, LONDON,
*Author of 'A Treatise on the Strawberry,' 'Market Gardening,'*
*'The Better Management of the Vine,' 'The Cultivation*
*of the Mushroom,' 'The Cucumber and Melon,'*
*&c., &c.*

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Fifth Edition.

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# PRACTICAL INSTRUCTIONS.

## THE POTATO.

After all that has been said and written on the subject of the Potato Disease, it appears that we are yet unable to give any satisfactory explanation of the causes which have spread it so widely and destructively during the last few years. It seems to be agreed that we must look upon atmospheric influences, of the nature of which we are able to give no account, as largely concerned in the production of the evil; yet, as I believe, I can show in the following pages, improper modes of cultivation have greatly aggravated, if they did not even give the first occasion to, the destructive visitation which has fallen upon the plant. My object has been, from the outset of my experiments, to find a practical remedy for the evil; and my attention has been directed rather to the endeavour to give strength and power of resistance to the plant, by improved methods of cultivation, founded on general physiological principles, than to apply temporary or speculative remedies to the symptoms of the disease presented during the later stages of the growth of the crops. In this essay, therefore, I shall mainly dwell upon the practical part of the subject, with a view to the benefit of those engaged in the culture of the Potato.

In 1847, I published a short account of my mode of cultivating the Potato, and the following extract from the Preface will explain the main principle on which it is founded:

"It is quite true that nature often provides seeds and tubers with more nutritious matter than the young plants require; but this is evidently a provision to adapt them to varying circumstances, or in fact, providing for the worst, and it seems to me that there is much danger in presuming upon such a provision. I would therefore strongly impress upon those cultivating the Potato, the importance of attending to the shoots from the tuber, which if *forced* (whether by careless exposure to heat and moisture or otherwise), are weaker than if slowly developed, and will require corresponding care in their after culture; and, moreover, of remembering that all superabundant shoots which they may have been allowed to develop, under the above circumstances are so many drains upon the tuber, and a waste of that matter which has been laid up for the support of the plant in the earlier stages of its existence. It is clear that the more support a plant receives from the tuber, the stronger and more energetic will be its power to avail itself of the extraneous nourishment presented to it, and an economy of the resources of the plant itself is especially important in those half-ripened tubers, so deficient in starch, which the late disease has left us."

In the first place, I will give an accouut of the plan of culture I have followed with the most successful results for the last ten years, during which time my crops have never been attacked by the disease.

Having but a small piece of ground I never save my own sets, and therefore buy what I want every year, as early as possible in October, before the eyes have grown. I consider that the potato should have a change of ground; those who have large farms may save their sets upon strong soil, and plant them next year on a lighter, and so on. When this cannot be done, farmers may exchange sets with each other, and the same plan is open to cottagers and others.

The sets are well greened in the sun and then laid out singly (with their heads all one way, this is only for very early produce, to preserve order at taking-up time when planted out) under a stage in a cold greenhouse. Of course all persons will not have such a convenience, but market gardeners may fill their "lights," putting the glass on and covering up accordingly as the winter advances. If they cannot spare frames, trenches may be dug; one 5 feet broad and 100 feet long will hold enough Potatoes to plant an acre of land. Farmers may find room in lofts, sheds, trenches, or other places; for cottagers a very small corner will be sufficient.

Care is taken that no water fall upon them, and nothing more is done until about the middle of January, by which time the shoots have grown about an inch. The shoot is very strong and green, the young fibres striking out from the base of the shoot and very bold and strong. I now put on as much mould as will cover them, and one watering is given to mix the earth in between them.

They are left then untouched until planting out time; they are not even watered, because the less water given to them the harder and more wiry they become, sending out an immense number of roots to collect food; in fact, when taken up in the middle or end of February, they have produced a complete mass of strong, fine roots, with a powerful stem.

The ground is prepared during the winter by trenching two spades deep and laying it in ridges. The ridges ought to run north and south, this being of the greatest consequence, in order to allow of an equal action of the sun and air on the sides. Early Potatoes should be planted in ridges from 18 inches to 2 feet apart, and the sets be placed at intervals of 9 inches; late Potatoes ought never to be planted closer than 2 feet to 2 feet 6 inches from row to row, and 1 foot from set to set.

As soon as the ground is trenched I sow salt and soot, in the proportion of about 2 tons of salt and 30 bushels of soot to the acre (I have used no other manure than this for five years). The planting is commenced by taking up the sets carefully and placing them in the bottom of the first furrow,* the shoots being placed parallel with the ridges. The mould of the first ridge is then laid over them carefully, as the shoots are by this time 3 or 4 inches long; the next ridge is proceeded with in the same way and so on, the ground being left at last in ridges, lying directly over the sets.

When the plants come up, they grow so fast that they smother the weeds if there be any. If May should be very dry as in some seasons, I am obliged to water, and when I do, of course I continue it twice a week till rain comes; for if watering be not continued, you only bring up the fibres to be killed by the heat of the sun.

The main points in the above mode of management are, that the Potato is not allowed to shoot and waste its substance in growth to be thrown away; the first shoot or bud is allowed to proceed onward to its perfect development, while in the common method of proceeding, the tubers are allowed to sprout from all the eyes, to produce a quantity of weak watery shoots, which are broken off and wasted at planting time, leaving the impoverished tuber in a condition which necessarily retards and weakens the future plants.

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* If all the side shoots are removed, leaving only the main shoot, the crop will be ripe or fit to dig nearly a week before the tubers with all the shoots attached, although the crop will not be near so heavy.

I have already stated that my crops of Potatoes have never been attacked by the disease, while it was committing its ravages on all around; and I may add that, until I published an account of the above mode of culture, I could undersell all growers of early Potatoes in the London Markets; since I made it public, the price of early Potatoes has diminished one-half.

The following observations and experiments are given as illustrations of benefits resulting from the new mode of culture.

1. Four rows of old sets, which had produced an excellent crop in 1848, were wintered on my plan, and planted out in February, 1849; they produced a very superior crop, but the two years' old tubers were then quite exhausted. This experiment was made to show what the tubers are capable of when carefully wintered.

2. Four rows of a late Kidney Potato were wintered upon the above plan; the smallest set weighed half an ounce, the largest one ounce (all *whole* tubers, for I do not in any case approve of cutting up the sets). Stakes are inserted down the centre of two rows when the plants were about a foot high; the halm was supported on each side by string. Another

string was added when the plants had grown to eighteen inches. The whole of the leaves were then stripped off to about one foot from the ground; this was done in expectation of a wet summer, to allow the sun and air to act freely upon the surface of the soil. The other two rows were not tied up, but allowed to grow naturally, but the lower leaves were also removed from them. The summer turned out very dry, and none of the plants were affected by disease, but the two rows which had been tied up yielded the best crops. From these facts I concluded that, as a general rule it was not necessary to tie up the halm, but that it was advantageous to strip off the lower leaves at about the time when the plants are coming into flower, since in case of a wet summer, the sun would act more directly upon the soil. The disease generally attacks the lower leaves first, probably on account of the mass of foliage keeping the surface of the earth damp and cold, in which case the lower leaves become unhealthy, and the tubers are placed in the same condition as if growing in a cold damp cellar. The above four rows were grown upon the ridge system, which I have practised for thirty years; it gives twice as much air, twice as much surface heat and protection against rain, double depth of mould, and keeps the surface dry and warm by good drainage.

The flat system is quite unnatural, for it is unreasonable to plant a Potato upon a flat surface, and after allowing it to grow a foot high, to draw earth over the stems and leaves. In such a case the plants must be kept back and weakened, for some weeks must elapse before the stems become blanched and throw out the Potato *strings*.

3. Growers upon a large scale may practise the ridge system in the following manner:

First ridge up the ground, then having a number of planters along the line, let them place the Potatoes in the bottom of the furrows. The plough should then be carried along the line, halving the ridge, and throwing up the earth on each side, so that the Potato will be left in the centre of the new ridge. When the halm is 4 or 5 inches above ground, a small plough should be sent through, taking down the ridge to within 4 inches of the plants on each side, and another plough following should mould them up again. In this manner all the weeds will be destroyed and the growth of the Potatoes quickened; but the ploughing must be done *before* the tuber *strings* have grown out from the stem. This method would not only ensure a much earlier crop of Potatoes, but would clean the ground for any other crop.

4. On the 1st of August, 1848, I had a border planted with sets ripened in the same year and which were well greened before planting. They grew very strongly and rapidly until they were killed down by the frost. I planted them in order to see if they would become diseased, but they escaped entirely, which goes to prove that the plants only catch the disease at a certain period.

5. In February, 1849, I removed the shoots, with the mass of roots from a tuber which had been wintered on my plan. The shoot was planted and flourished well, ripening its tubers as early as those plants to which the tubers remained attached. The divided tuber was also planted at the same time, but was a month later in ripening since it had to make new shoots and roots; but it was ripe *just as soon as those seed Potatoes which had been wintered on the old plan and had been picked over two or three times* during the winter and spring, which has too long been the practice.

6 I do not recommend cutting off the stem when out of flower; I have tried it and found that the same kind of Potato grown on the same ground produced very inferior tubers when so treated; they contained very little starch, while those left to nature were very mealy.

7. The four rows of late Kidney Potatoes mentioned above were planted out about the middle of February, and were quite ripe by the middle of August. It is quite extraordinary how fast, healthy and well-rooted Potatoes will grow; I have laid bare the tubers when one inch long, and six days after examined them again and found the length doubled. I believe that what are called late Potatoes are made a month later in ripening by mismanagement. The plants are injured in constitution by being heavily covered with straw and mould, sweated and caused to grow, and the shoots are pulled off two or three times, wasting what nature provides for their future growth. Some growers do worse than this: they cut them up into sets, and expose them to the air to harden the wounds; and others even cut out the eyes with a small piece attached, and throw the mass of the tubers to cattle and pigs, so that the young plants are not allowed their fair proportion of the already half-exhausted store of nourishment.

8. I have tried the plan of keeping setting Potatoes in heaps, with certain precautions. The tubers were heaped up on the surface of the ground in the usual manner, in the form of a ridge; but instead of covering them closely with mould and straw, I had some hurdles placed about one foot above the tubers, and then thatched these over with straw, leaving a hole for cats to go in and catch mice. As the winter advanced I

added more straw. By this simple plan all sweating was prevented and the tubers showed little signs of growth until the time of planting in February. I tried this experiment to prove that, however large the establishment, my method might be carried out with advantage. A trench at least 18 inches deep must be carried all round the heaps, to carry off the rain and to keep the surface of the ground on which the Potatoes lie well drained.

9. All setting Potatoes should be kept as dry as possible, and they cannot be kept too cold; as much air as possible, and even light if practicable, should be admitted to them, as they are thus kept from growîng and wasting their strength at an improper time. When the seed Potatoes are left upon the ground to become green, after digging up, the tendency to winter growth is much diminished, and a large grower may stow them away six or eight inches thick for the winter.

10. In 1848, the disease travelled northward and westward, as the sun gained strength, although *not shining on the earth*, as the atmosphere was damp and cloudy. The Potato plants grew luxuriantly, and the stems and foliage were full of watery juices; the richer and more retentive the soil, the more luxuriant was the growth of the plants. Very suddenly the weather became clear and a very hot sunshine came over the country. The plants were scorched, and probably the breathing pores became obstructed or destroyed by the rapid exhalation; the fluids of the plants being thus prevented from diffusing themselves in a natural manner, fermented and became diseased. It has always been noticed that the disease appears in the night after a hot sultry day, especially if the next day prove wet. The halm is observed to putrefy, the

lower leaves going first, being previously in an unhealthy state, and more exposed to the steam which the hot sun draws up from the soil on the previous day. The tops are always the last to fade, being drier and more exposed to the air, but they go at last, from the general circulation being stopped.

The disease has not attacked the crops in general, since 1845; in dry, hot and regular weather, and in the native condition of the Potato, the climate is regular, and the surface of the earth dry and warm during the period of growth.

The disease did not break out in 1849 in the south of England until the 10th of August, although the nights had already been cold and sometimes frosty, but there was plenty of sun during the day. About the 10th of August, we had some cold, wet weather, and directly afterwards some hot bright sunshiny days. The disease then showed itself in the lowest and dampest situations.

11. Some have supposed that the disease is absorbed by the tubers from the atmosphere, because those nearest the surface and furthest from the parent stem are the first to catch it. This is easily explained in another way; the tubers nearest the surface are generally the last formed and most unripe, and in a wet season are in the coldest situation, under the dense foliage; besides, the descending diseased juices flow more abundantly to the younger tubers than to those more advanced, and when the tubers are very forward before the disease appears, they are comparatively little affected.*

* In buying seed Potatoes for my own planting, I have always found diseased ones amongst them; they were laid by themselves, and treated according to my plan, the top eyes generally being safe. They produce as good a crop as the

12. All plants are liable to disease, according to their kinds and under peculiar weather, such as when the sun breaks out clear after a long continuance of dull, wet, cloudy weather. The sap cannot then evaporate fast enough from the gorged tissues, and decomposition takes place. In some plants mildew results, in others, such as the Potato, fungi attack also the cellular structure within. After long continuance of damp, cloudy weather, the halms often exhibit rusty spots close to the ground, showing the unhealthy condition of the juices flowing from the lower leaves; but this will not go on to the regular disease, unless a hot sun comes to ferment and decompose the juice. I have dug up a few roots with tubers attached, and left them exposed upon the ground; but the tubers did not become diseased, nor did fungi appear upon the halms, since the plants died at once here without any fermentation. In the usual cases of the disease, the injury is only sufficient to render the sap unhealthy, this unhealthy sap then spreads to all parts of the plant before it dies, and thus the tubers exhibit the disease.

13. It is a well-known fact that buyers of Potatoes in the spring season, cut a piece out of the string end of the tuber to see whether it is getting black. This blackness is caused by the winter growth, drawing the starch away from these parts, and leaving the cells empty. Until this autumn I have never noticed this blackness before growth;—the appearance of the black spot so early as November can only be accounted for by imperfect ripening, the leaves having died before the cells of the tubers were filled with starch.

others, with no disease. I decidedly object to seedlings, as in an ounce of seed they all vary, some early and some late, some large and some small, they neither eat alike nor keep alike.

14. "Mealy" and "waxy" Potatoes may be known by the growth of the eye. The mealy Potato sends out a slender shoot, containing little water; the waxy tuber sends out a bold, stout, but watery shoot. Waxy Potatoes are such as have been taken up before ripening, or have been allowed to grow during the winter.

15. It has been noticed that Potatoes after having been stored up some time catch the disease. This merely results from imperfect ripeness, the Potatoes are then unable to resist the decomposing agencies of heat and moisture to which they are exposed.

16. Cookery.—From the time Potatoes get ripe up to April, they ought to be scored crosswise, just cutting through the skin. This makes them mealy, and saves the whole of the best part of the Potato, and just before sending them to table, let the skins be taken off them. After April this plan will no longer do; but it is a well-known fact, that owing to the inherent nature of the Potato to grow, it leaves the tuber soft and spongy, losing much of its water; and no vegetable can cook well if the vessels have not their natural supply. All water contains air, and as soon as this moisture comes to the boiling point, it swells and bursts the tissue, destroying all the fibre. Therefore all potatoes after April ought to be peeled and steeped in water ten or twelve hours before cooking. And in towns, Peas are much improved by steeping several times before shelling. The steeping is a first-rate plan for all things long gathered.

A few rods of ground were planted with small tubers of a late kind, called Lapstone Kidney, a seedling raised by an old shoemaker, wintered upon my plan. This famous sort was presented to me by a clergyman in Yorkshire; it came up very strongly, but the severe frost on the 10th of May cut the halm level with the ground. Every joint sent up fresh shoots, which if left would have weakened the roots. On the 28th May I pulled up all the weakest shoots, leaving only three or four of the strongest. I found on pulling the shoots up that they had several fibres; an idea struck me that if planted they would produce a crop. I planted a row of the shoots with a dibber, 6 inches plant from plant, and 6 inches deep. I dug up a root on July 28th, three nice Potatoes were attached to it, weighing together 8 oz., just two months from the time of transplanting. They had the disadvantage of being planted out during the very hot weather. The halm in the row is strong, but not crowded. The transplanted ones will stand a better chance of escaping the disease on account of having few roots; consequently not so luxuriant, and allow the air to act upon the surface of the soil. The lower leaves are green and healthy, while the rows with crowded and dense foliage are all yellow below. This idea may lead us to adopt the sprouting of the sets and pulling the shoots off, transplanting as we do beet, mangel, or swedes, or cabbages, only the shoots ought to be 6 inches long, and just keeping the head above the surface; but if the land is light, the head being placed an inch below the surface will be all the better.

Had those late Kidneys which I have experimented upon, when transplanted, been planted out a month earlier, they no doubt would have been now (July 28) quite ripe and past all danger of disease. This plan might incur too much trouble for many, but any plan to preserve them from disease, even if we get a small crop, must be better than losing all, until these extraordinary seasons shall have passed away, and the Potato recovers its usual health. The piece of Potatoes mentioned above was taken great care of during winter, and planted as an experiment, in order to show that a late Potato could be ripened by the 1st of August, and so they would, had not the frost thrown them back a month.

Every Potato-grower knows that after the shoots produce roots, the tuber is of no further use, therefore if by timely sprouting and timely planting we could ensure a fair crop, the plan might save a deal of trouble, the land being clean and in good order at transplanting time, all in *ridges*, no further ploughing and hoeing would be required till the crop was ripe; for it appears that many of our tender foreign introductions are becoming diseased, such as the Potato, the vine and the ridge cucumber. This makes the fifteenth or sixteenth year in which cucumbers have failed round London in the open ground. A melon or cucumber-grower knows, or ought to know, that if he water his frames too much in dull weather, and overgorge the plants, that when dry hot weather sets in, in a few days afterwards, they will have "the canker," and very often mildew; but if he had refrained from watering, and shaded in hot sunshine, to give time for a regular evaporation and elaboration of the sap, these diseases would not appear. See a full account in my Cucumber and Melon pamphlet. All greedy-feeding foreign plants are liable to disease, according to their kind, in such seasons as these; the sun has as much power in injuring the pores and the sap vessels after wet and sunless weather, as frost has in bursting them in winter.

Some thirty years ago a gentleman whom I then lived with, bought what were called *Dutch Winter Potatoes*, they were to be planted in the autumn and to grow all the winter; the impostors charged a guinea a peck for them; it was a round Potato, they were planted according to directions, but when the frost came, away the unfortunate tops went like all others; this very plan is now practised for Covent Garden Market; the old tubers are kept back until July, and then planted. They grow very fast, but they are not near ripe by the approach of frost; as soon as the halm is cut down, large quantities of straw are put on the ground, and towards Christmas the tubers are dug up, and put into one and two pound baskets, and are sold for new Potatoes, at from sixpence to eighteenpence per lb.; they are as full of water as a turnip, the leaves being all destroyed before the cells had time to become filled with starch: the Cornwall Kidneys are the only ones used for this purpose; by taking one in your hand you will find the skin firm on, which is not the case with a new Potato, either grown in frames or in the natural ground.

If growers of the Potato will continue to cut the tubers into sets, all the crown sets ought to be kept together, and the bottom eyes planted by themselves; for the sap of all potatoes rises to the crown eyes first, and when cut and planted indiscriminately, after a mild season, the crop is alternately good and bad, *i.e.* the sap is so much abstracted from the lower eyes by the top ones that the former either push weakly or not at all.

On the 15th September, 1853, I received a letter from a gentleman in Northamptonshire, who has practised my plan for three years; and this year, he has just sold the produce of ten acres for £298, while many growers round him had their crops nearly all diseased. And Dr. Lindley has said in the "Gardeners'

Chronicle," that my plan was the only safe preventive if strictly followed out.

There are many observations in the foregoing paragraphs which were written by me in the very midst of the Potato disease that might have been altered or left out, but I have thought it best to let them stand, as most of the paragraphs are tending to the better cultivation of the Potato. It has been admitted by all growers that greening in the autumn by exposure to sun and air before putting the intended seed or setting Potatoes by for the winter, alter their constitution and makes the eye more wiry or woody and hardy, the tubers will stand five degrees of frost, also the bulb is not forced on in a premature way as upon the old winter storing practice, and when planted for growth, having all its stamina, it grows at a rapid rate towards maturity; so much so that I found a whole tuber weighing only two ounces to far exceed one weighing four ounces that had been wintered upon the old plan.

In conclusion, growers will be right in not planting any tuber which does not show the eye starting, especially with early Kidneys, either for the frame, or open ground, if they are not sprouting, and are planted anyhow, a disappointment is sure to be the result by having only half a crop. Again, for early crops it is a good plan to scatter a little half rotten dry horse-dung on the sets in the row before covering over with mould, not forgetting a dusting of soot over the sets also.

I trust that I have said enough to incline growers to the better management in the production of a food which has long proved itself to be second only to the staff of life.

I was much assisted by the powerful aid of the "Times" newspaper, which was open to me at all times. I had also free access to the "Gardeners' Chronicle," in short to the whole press of this great and free country, to all of which I am deeply indebted.

A German chemist tells us that, in August, 100 lbs. of Potatoes contain 10 lbs. of starch; in September 14 lbs.; in October 15 lbs.; in November 16 lbs.; in December 17 lbs.; in January 17 lbs.; in February 16 lbs.; in March 15 lbs.; in April 13 lbs.; in May 10 lbs. I cannot understand why starch can increase while the tuber is dormant, but I can easily understand the starch decreasing in spring, or at any time if allowed to grow.

## CULTIVATION OF POTATOES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

DEAR SIR,—I have forwarded a gentleman's practice of growing Potatoes, which is so good that I trust you will give your readers the benefit of it. This gentleman was one of the early purchasers of my Potato Pamphlet, and he has made large sums of money by following out the principles which I have recommended.

I am, sir, your very obedient servant,

JAMES CUTHILL.

*Camberwell, London.*

## TO MR. CUTHILL.

Dear Sir,—My plan for wintering Potatoes is as follows: Having allowed the seed to green and harden on the land when the crop is raised (which causes the Potato to make a firmer shoot), I place them in a barn end, and cover them over with straw until the end of January, by which time I find, by having been kept warm, they begin to show shoots. They are then laid out as thin as we can, say six inches deep, and so remain until they are planted, by which time the shoot will be quite firm. I never like to plant a Potato less than one inch in diameter, and set them whole. I always preserve the strongest and best manure I make, a considerable portion being from pigs.

My land for next year's crop is now deeply ploughed; as soon after the first week in February as it will work, I shall harrow the top fine, put on twelve tons of manure, well spread it, and then set my crop as follows:—Each plough has two women to follow it, with sets, who plant the Potatoes in every third furrow. The ploughs are set so as to leave a space of 26 inches between the rows, and we place the sets 14 inches apart. This appears wide, but I have tried and weighed all distances from 8 to 14 inches, and find 12 and 14 inches the best; and the latter distance has this advantage—it produces as much weight and fewer small potatoes, and also takes less seed for planting. Having ploughed them in, I leave the land exactly as the plough lays it; thereby it is open and light underneath, giving the potato room to throw out the wires; and being rough on the top, weeds do not get forward. As soon as the plants are well up in the rows, I roll the land down, and harrow it with a pair of light harrows, which moulds up the plants, and gives you a fine top. As soon as necessary, I hoe the rows well, cleaning out all weeds, and then mould them up. I find this plan inexpensive, and it produces fine crops. The care of the seed is not so fully carried out as by your instructions, but I think it is close enough to your principle to derive all the benefit, and is more in accordance with a farmer's means, space of premises, &c., &c.

I remain, yours truly,

E. C.

*Water Newton.*

DEAR SIR,—In reply to yours I beg to say that I have never cultivated any sorts of potatoes but the "Regent" and "British Queen"—two varieties so similar in shape and size that there is little other differences in them than that the latter is an earlier sort by about ten days.

If you examine a sound potato, you will find one or two eyes at one end, and from four to five at the opposite; I rub off the shoots from the end last mentioned, leaving only the two; and hereby they are stronger. With the exception of three fields, which are good deep gravel, my farm consists of mixed soils; indeed, I can dig brick-clay, and gravel or stone, in every other field I occupy. When I took it, I found the strata of clay drained twelve inches deep, for which it was none the better; to the horror of my neighbours, I cut through that, five feet deep, into the gravel, where I found the water pent up. The clay is now disappearing entirely, for want of one of its component parts—water. I get good crops of potatoes on all these varieties of soil, generally the finest tubers on the strongest land. Since I have followed your plan of carefully attending to my seed —early sowing, early digging—I have had no disease of consequence; and for the last three years have not seen a really diseased tuber.

Yours truly,

E. C.

*Water Newton.*

P.S.—I plant about sixteen acres yearly; this year I shall have eighteen acres.

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# ASPARAGUS.

THE Market Gardeners round London are now producing Asparagus much better than they used to do, since the absurdity of only having three inches of eatable matter at the tops, has been so much exposed. They are also reducing the enórmous covering of earth, of from twelve to fifteen inches, to six or eight inches; also by allowing the asparagus to rise about four inches above the earth, this will give something like six inches of eatable matter. This is just the plan of the private grower, and I believe that Asparagus grown by the gentleman's gardener is as fine again in flavour, as well as containing much more eatable matter. The enormous bulk of mould only tends to weaken the plant, and is quite against the nature of it. A bundle of 100 heads of the so-called best Asparagus looks well to the eye, but when the cook gets hold of it, three fourths of it goes at once for Mr. Pig, then only do we find the expense of a dish. It is a very hard case, that although it is a native of Britain, through the expensive way of growing it, tradesmen and the lower classes do not even know the taste of it, no doubt owing much to the expensive ground it is grown in, as well as from a misunderstanding of the physiological construction of the plant. The Market Gardeners' plan of growing is as follows; but in the first place I would mention that there is but one kind of Asparagus. A Mr. Grayson, an extensive grower on the south bank of the Thames, introduced what he called his "Giant" Asparagus; but it proved to be only the usual kind. He made it a giant by putting mould over a few of the very largest heads he could find on his extensive beds, which covered about thirty acres. The heads were cut and shown in market as a new sort. They were about eighteen inches or more in length, and a hundred heads weighed 42 lbs.; but, unfortunately, like other Asparagus, only three or four inches were fit for eating. There can be no doubt, however, that the present plan of saving seed from the strongest plants has much improved Asparagus.

The present plan of making Asparagus beds round London, consists in putting on an immense quantity of manure, and trenching the ground three or four feet deep, mixing the manure as the work proceeds. In March, the ground is measured out after the following manner: suppose that a fence runs south or north, or otherwise, three feet are allowed between it and the first row; a drill is drawn about two inches deep, the seed sown thinly, say six inches or a foot apart; that gives choice of drawing out the weakest, in order that the permanent crop may stand one foot apart. The next row is sown eighteen inches from the one just mentioned; then for the alley and two sides of the bed five feet are allowed; then another row of seeds, and so on, that gives two rows to each bed. The first year onions are generally sown all over the ground; the second year, lettuce or any dwarf growing vegetable that will not choke the Asparagus; and so on until the third year, when the beds are formed out, and a few inches of mould dug out of the alley and put on the crown; but only a few of the finest heads are cut this year. Autumn arrives, and when the halm is cut the whole of the ground is forked over, and planted with cabbage, coleworts, or winter greens; then in spring the beds are largely supplied with mould out of the alleys, covering the crowns from eight to ten inches deep. The finishing of the cutting must be left to the grower. A fair crop of heads must be left after four or five weeks' cutting, in order to strengthen the young buds for the next year's crop, and to restore to the roots what has been taken from them in the shape of a crop; but not one head must be allowed to grow until you leave off cutting entirely, at the end of the fourth year. When the halm gets ripe it is all cut down, and the mould thrown into the alleys and there enriched, and the whole of the beds and alleys are planted again with coleworts, &c., for winter use. Immense quantities of roots are forced on two feet of dung in trenches, having six inches of mould to plant in. These are then hooped over, and blanched, to make it look fine and white. Such is the treatment which the London Market-gardeners give Asparagus; but the plan which I have practised for these twenty years is as follows: as soon as the dead halm is cut down in autumn, I give the beds a good dressing of rich manure for the winter, salting them in spring, and covering the manure with mould to prevent evaporation. The rain carries down the strength of the winter covering to the roots, and when spring arrives it must be raked off into the alleys, leaving only mould enough on the beds to protect the roots from the summer sun. We have then Asparagus, green, and eatable almost to the very root. The Rev. George Wilkins of Wix, proved that, by the above management, he cut Asparagus much earlier, and in much greater abundance, with much finer flavour, than by the deep covering system—see the 'Gardeners' Chronicle' of the 12th of May, 1849. Seaweed makes the best manure, when it can be had, for Asparagus. Perhaps the finest Asparagus I have ever seen was at Ipswich; the beds were at the bottom of a garden where the river Orwell runs past. During the winter this river overflows its banks, and for some five or six weeks these beds are partially covered with water. This, no doubt, left a rich deposit; but the best time to irrigate would be in the growing season. The roots of Asparagus are largely provided with fibres, evidently formed to take up much water, and my flat system would facilitate the irrigation system much.

Why should not some spirited gardening farmers establish a few fifty-acre fields for its growth? An eligible site for them could be easily found along the lines of railways, choosing a deep sandy, loamy soil, but not tenacious clay, for the purpose. A soil of this description would be rich in itself, and would not require so much manure as very light sandy soil would do, and in which it is now generally grown. The light soil gets lighter every year, on account of the manure put into it; but good loamy soil would produce Asparagus to pay at less than half the price it is now sold for in the London market, and every class would then be able to partake of it the same as any other vegetable.

To establish a field of Asparagus, spade labour must be resorted to, clearing out most carefully *couch*, *bindweed*, &c., and using the strongest and best manures, as night soil, cow-dung, salt, stable and other manures. Sewage water would suit perfectly, if it could be had and applied in the growing season, and when the plants are in bearing; it might be applied after the crop is cut, for that is just the time when the roots are most in want of a stimulant to form a mass of fine buds for next year's cutting. The field ought to be well drained, all drained land being warmer, earlier, and much more productive than undrained; and otherwise well prepared in autumn, before the heavy rains of winter set in. It should be trenched three spits deep if possible, the last spit forming a ridge, which would be well pulverised by the frost. In March those ridges should be levelled down, and the ground laid out for planting.

As it is my intention to discountenance the production cf long white drum-stick Asparagus as much as I can, I beg leave to advocate the following plan, by which, in time, every row will form its own bed. I propose that each row be planted four feet distant from the other, and that each plant stand one foot apart in the row. A Market Gardener, at Boston, has 8 acres on this plan. This will give ample room for cleaning the crop, and for drawing up earth over the crowns, so as to form a ridge three or four inches deep, to be lowered again for the purpose of enriching the soil in the autumn and winter. By this method I consider that Asparagus might be cut at least ten days earlier than it is by the plan now practised, by burying the roots deep in a bed of earth, where sun and air cannot act upon them; and as for flavour it has long been proved that although gentlemen's gardeners do not grow Asparagus so large as the market gardener, of the two it is by far the finest in flavour, with at least three times more eatable matter in each, though only two-thirds the length. I have had Asparagus sent to me from Brussels all blanched together a beautiful creamy white, but when cooked, I could not discover the taste of Asparagus in it. It was watery and insipid, as highly blanched Asparagus must always be, having only the watery flavour of the roots. I have proved this years ago, by keeping it in frames shut up, and the glass covered over with mats to exclude light.

I imagine that I have said enough to explode the old-fashioned and expensive plan of growing this much-esteemed British vegetable. Some imagine that unless the roots are covered during winter, the frost will kill them; if roots are moved during winter, the wet will rot the injured fibres, and no gardener who understands anything of vegetable physiology would think of lifting the roots for planting until February or March, unless for forcing, and the latter are put into heat at once; but Asparagus is perfectly hardy. The plan of putting large quantities of manure on it during winter is nevertheless good; for the winter rains wash the strength of the manure down amongst the roots. I should give the ground a good salting annually in February, and when cutting is discontinued in June, I would *soak* with manure water, or town sewage water better still, or even spread on dry, artificial manure, for the heavy rains will wash the strength of it among the roots, and just at the time when the latter were making fresh crowns for next year's crop. This is, no doubt, the proper time to manure Asparagus. If the above method of cultivation is adopted, I doubt not that its benefits will soon be discovered, not only in the shape of improved "grass," but also by the consumer. I believe that it is impossible for the grower to alter his mode of culture without the assistance of the consumer, and I am sure that by the plan I have just been advocating the drain on the roots will not be half so much as it is now, owing to the fact of the latter having to form such a quantity of underground sticks, ultimately to be thrown away. Wherever it is practicable Asparagus ground should slope to the south or south-east, and the rows should always run south and north. Where the land is light ploughs might be used in throwing up the ridge on each side of the row, and then it could be forked over. The chief labour and expense will be in cutting and sending it to market, which will form employment for the people in the neighbourhood.

# SEA-KALE.

SEA-Kale is another most wholesome and delicious vegetable; but owing to the expensive ground in which it is grown, as well as the costly management, the middle and lower classes seldom or never taste it. I shall not describe the present way of managing it, for that is well known; but I shall proceed at once to detail a plan that will supply the London markets at a time when other vegetables are scarce. When we reflect that this is also a native of our sea coasts, it is very hard that we should have to pay a shilling for a moderate dish of it, and that too in the month of April. This vegetable, the very reverse of asparagus, unblanched is wholly uneatable. I would propose that acres of it be planted near the various lines of railway, choosing for them a rich, deep, loamy soil, sloping to the south. The ground ought to be well drained, which at all times makes 4° or 5° difference in its temperature, and then trenched at least two spades deep, previously putting on a good dressing of dung. Salt could be put on (two tons to the acre would not be too much) every February. Supposing the ground to be ready for plants by February, and a large stock of roots that had been sown in the previous spring at hand, take up the roots and cut off the head or eye; then cut up all the roots into lengths of three or four inches, taking care to know which are the top ends; for if this is not attended to, and the lowest part is planted upwards, the eyes when they grow would have to take an opposite direction, and would not make so fine plants. The reason why market gardeners get so fine Kale is owing chiefly to their not allowing more than one bud to grow on a plant at thinning out time in spring; gardeners in general leave five or six. Market gardeners all force Sea-Kale. Upon my plan the rows should be three feet apart and one foot from plant to plant in the row. The reason why three feet are allowed between the rows is to give fair space for the Kale to grow in, as well as for an intermediate crop, which I expect will pay for the expense of the Sea-Kale. A single row of kohl rabi, mangel swede turnips, or cow cabbage, would not shade the Kale too much, and in the autumn when the temporary crop is removed and the Kale leaves are getting yellow, the leaves might then be taken off the crown to the centre between the rows, there to be dug in along with the manure. This would enrich the centre for the next year's intermediate crop.

In the first place, land for Sea-Kale must not be too light unless it is very deep, and if heavy it would be wholly unfitted to blanch the heads in; besides, all Kale must then be washed, which would spoil it. Sea-Kale ought never to be wetted until cooking time. Its roots are often much destroyed by wire worms, but a good salting and application of soot would stop them from breeding, and in time would eradicate them. The length of time the old roots ought to occupy the ground ought also to be entirely altered. Gentlemen's gardeners in general, look upon a piece of Sea-Kale when once made to last for ever; not so the market gardener; he is always first in everything, because he has to make the best of everything. Who has not seen in private gardens plants growing in summer, some two feet apart, some four, and some rows entirely gone, all in the most irregular manner. The process of lifting the roots for forcing would soon alter this, and by following the above methods, large supplies of this most delicious and much neglected vegetable would be obtained; and all classes, at a time when other vegetables are scarce, would be enabled to eat it. Sea-Kale, being hardy, would be forced a little by the sun acting upon the earth, if it were covered with mould; and, I am quite certain that the crops would pay much better than grain, or root crops; but it must be borne in mind, that for late crops of Kale or Asparagus either, ground sloping to the north would make it ten days later; and as for the old plan of putting on large quantities of leaves mixed with dung, it ought at once to be given up, being not only unsightly, but expensive and inefficient, boiling the plants in the centre, while the outside row was quite cold. Propagate roots every year; take them up when wanted and put as many as you need into a frame with a very little bottom heat. Pots could be used for it, either in a small or large way, by putting two or three roots into a pot—a plan I have followed in the blanching of chicory. I would simply take up the roots, plant them in the pots, and reverse the next smaller size over the crowns, stopping up the holes with a piece of clay, watering the roots, and then placing the whole in a moderate heat. By this means a much better succession of Sea-Kale could be kept up than by employing cartloads of unsightly fermenting manure. When the sets begin to grow round the edge of the top let them be thinned out to two eyes. See my "Market Gardening."

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# RHUBARB.

By the plan I am now about to propound, I think Rhubarb might be had fit for table at least five weeks before the London growers could obtain it out of doors. But, in the first place, let me premise, that there is a wide difference in quality. Myatt's Linnæus and Michell's Royal Albert are the earliest and the best flavoured, and wherever any of the other rougher sorts exist, they ought to be done away with at once; for there is as much difference between the flavour of Rhubarb, as between a ripston pippin and a codlin apple. Besides, we want everything early, and as Rhubarb is so easy of carriage, what reason can there be why Cornwall and Devon should not furnish it in large quantities, as they now do the London markets with their far-famed white winter broccoli. In these days Rhubarb would find a ready market in every town in the kingdom, and there would be no fear of producing too much, provided it could be sold cheap enough. As manure is a principal item in its culture, the supply of this must be duly considered, before the locality is fixed on where it is to be grown, which should be fields contiguous to some line of railway. Being one of the grossest feeders of any vegetable we have, Rhubarb should have plenty of manure; and just in proportion as the latter is well or ill supplied, will the crop be abundant or scanty. The very strongest manures, as cow dung, night soil, horse dung, or sewerage water, suits it perfectly. In the latter might be soaked Irish peat charcoal, which has the power of absorbing a large quantity of water readily, and every thing grows well in it.

My plan is to form large plantations of Rhubarb along the side of some railway in Cornwall or Devon, and, as in the case of Sea-kale and Asparagus, if practicable, ground should be chosen for it that slopes to the south, for this will make a difference of at least ten days in its earliness. When the land has been selected, dung it heavily, and trench it at least two spits deep. This should be done before the heavy rains of winter set in. Soil of too stiff or too clayey a nature must be avoided, for that would make a difference in the earliness. For the same reason, wet land should not be selected, for that is at all times 5° colder than well-drained land; besides, the latter offers facilities for air reaching the root, which wet land does not, and without air the roots cannot thrive any more than the tops can.

Before making the permanent plantation, it would be well if a large number of the best sorts were previously planted out thickly in a piece of ground and coming forward; these might be divided and increased with advantage, leaving a bud on each division. This will multiply your stock amazingly, and lessen your outlay for plants. Mr. Myatt plants 4 feet square, but that is quite a foot too wide for field culture, if no other immediate crop is intended. The plants ought to be put in alternately, or quincunx fashion, which gives them more air, and the roots fair play. In the first year something dwarf might be sown between the rows, as turnips for instance. Next year the Rhubarb plants will afford a fair picking, and in doing this some leave nothing but the flower stems to draw up the sap, until the last pulling takes place, and then the flower stems are removed; but Mr. Myatt makes it a rule never to pull every stalk off; for that injures the roots. It is quite certain that leaves and flower stems are, in a great measure, formed out of the matter that was stored up in the roots the previous year, and if we cut them off without allowing them to restore to the root that which they have taken from it, we shall have a weaker growth the following year. It is on this principle that the leaves of crocuses and snow drops are never removed by good gardeners till they have fulfilled their office, and become withered; for if they were the result would in all probability be no flower next year. Rhubarb roots should therefore never be perfectly denuded of foliage.

I mentioned to a London market gardener, one day, that I was of opinion that Cornwall and Devon would ultimately be found to be the great marts for our early Rhubarb. His reply was, "We can beat them hollow." "That well," said I; for the whole of the north of England and Scotland too are ready to receive not only early Rhubarb, but everything else. At the present time (April 25th) there are many tons being sent northward daily. There is no fear therefore of glutting the market. The Cornwall and Devonshire growers might easily have forced Rhubarb all the winter, by making trenches five feet broad, and one or two hundred yards long, taking up the roots and packing them in the trench and putting mould upon them. Hurdles covered with straw might be placed over all. Nothing would be needed; but of course it would require immense quantities of roots to replace those that were forced, which should not be thrown away, but cut into eyes and planted again. In order, however, to save the roots where they stand, and still get them earlier, they must be covered with pots, which must be made for the purpose, not less than 18 inches high, and a foot in diameter. They should have no hole at the top, as that would not only let out the heated air generated in the inside by the sun's rays, but would cause the interior to be colder than the external atmosphere. To avoid the expense of pots, covering the crowns with plenty of straw is a good plan, to protect it, the straw would afterwards act as a manure to the ground. Covering with straw is now generally adopted. Many persons prefer Rhubarb grown in a half-blanched form, they think it more delicate in flavour: one thing is certain, that it does not form so large leaves, and would be easier packed. The mild climate of Cornwall and Devon would, however, without any artificial treatment, produce Rhubarb fit for use at least five or six weeks before it could be brought to market from anywhere else; and instead of having five or six weeks' cheap Rhubarb, as we now have, we should then have a two or three months' excellent supply. It is now (March 10) selling at 1s. a bunch of from twelve to eighteen heads, which, trifling as it may appear, is such a price that the middle and industrial classes cannot pay.

Ireland, which has the finest land and climate in the world, and which has railways passing from its south to its north, possesses extraordinary capabilities for producing everything in first-rate style. The south could supply the north with early produce; the north again could supply the south with late produce, and in this way a long continuance of good and cheap things would be the result. But when shall these things be? When shall that unhappy portion of the British dominions care for its own and its neighbour's interest? Let us hope that it soon will, that the dark cloud which at present hangs over it will pass rapidly away, and ere long fair "Erin" will put on a bright and a more industrious and smiling face.

# CELERY.

The destruction of Celery in 1862 in private gentlemen's places was all but complete. The maggots were never known to be so numerous. Those gardeners who had more time, and picked off the first infested leaves, suffered less; those who did not notice the brown leaves till too late, and perhaps had little time to spare, all but lost this favourite vegetable. How to account for the large numbers of the insect, after so wet a summer as 1860, I know not; and it appears that the insect bored into the foliage of cinerarias and other plants, and deposited its egg, for it seems that it hardly ever lays more than one egg in the same hole in the leaf. The only two remedies known to me when I was a grower of Celery were—first to scatter soot over the foliage, while the dew was still on the leaves. Should it rain and be partly washed off, repeat it again, for if the soot is washed down to the roots, so much the better for the growth of the plants; but bear in mind that soot will not kill the insect or grub when once deposited by the mother in between the two skins of the leaf. Soot prevents the butterfly from laying its egg, as it cannot bear the taste of the bitter soot. The second remedy, when once the eggs are inserted, is to go over the plants as early as the spots on the leaves are seen, and bruise the caterpillar between the finger and thumb, or, if spread too far, to nip off the infected at once and burn them. The trouble is not so very great if taken in time. Market gardeners are not so much troubled on account of their continual trenching two spit deep once a year, and keeping their ground clear of all breeding weeds and filth. Celery ought to be sown early in February in pans or shallow boxes, and when sufficiently strong pricked out again into shallow boxes and gradually hardened off; and then prepare a bed out of doors, the bottom to be trodden hard, then upon this lay a couple of inches of rotten manure, adding all over about two or three inches of rich mould. In planting out these beds the roots may be cut in a little, so as to make the plant very fibrous. Nothing more is required but plenty of water at the final planting out, if the plants have been attended to. Neither root nor top will require pruning. The reason why shallow pans or boxes are used is simply to make the plants more fibrous, and by treading the ground hard before pricking out into beds is also to keep the roots confined to the fresh-made bed. If they are pricked out on a deep soil the roots get more carrotty or taprooted, the plants grow less rapidly, and are more likely to run to seed. It is also a great mistake to mould the plants before they get fifteen or eighteen inches high, as too early earthing up deprives the roots of rain and artificial watering, and, should the autumn be dry, many of the plants run to seed.

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# THE TOMATO, AND ITS USES.

The seed of this esteemed esculent is sown round London, in March and April, in shallow pans or boxes in light soil, and then placed in heat. When the plants are about two inches high, plant into small pots in rich mould. When the plants fill the pots with roots, shift into a size larger, and by this time they can be put into a much cooler place. The plants are now topped, and are planted out in May. Mr. George Bagley, of Fulham, showed me his crop three years running, every plant covered with fruit from bottom to top, each plant only allowed two shoots, trained up the walls, one foot apart each shoot. The great secret is in pinching off the head continually, just at the bunch of fruit; for, if allowed to grow two or more eyes, then they would lose their fruiting in luxuriance of growth. This pinching off the head is continued to the height that the plant is grown to (about three feet high or so), and this height is quite enough for the plants to ripen off their luxuriant and splendid loaded crop. In the above management not one shoot nor any superfluous foliage is allowed to drain the resources of the plant. The fruit also ripens at least a month earlier than by the old system. I have always stopped my cucumbers in the trellis in the pits at every joint, but never thought of doing it with the Tomato. Mr. Bagley had not only his dwarf walls covered with the Tomato, but he had ridges thrown up facing the south, and straw spread on the south side of the ridge to keep the mould from being washed down, also to keep the plant and fruit clean, and mulched at the bottom, to prevent the sun from drying the earth round the roots. Mr. Bagley also had this plant growing up sticks in the centre of his marrows, all grown on the same system, and all loaded with heavy crops. My principal object is to encourage the cottager to grow this plant for his own consumption; every one has a bit of garden ground, and he could always beg a few plants from the nearest gentleman's gardener, if he has no convenience to raise them himself.

The Americans eat the love apple raw, just the same as our labourers eat onions. But it is to make sauce that I recommend its growth. Now, before I found out the simple way of making the plant bear a heavy crop, I dared not have recommended the cottager to waste his time about it, for this plant, if allowed to grow anyhow, is the most barren of any plant I know of; and when fruit is produced, half of it never ripens at all. A simple and easy way to make Tomato sauce is—when ripe, cut them into slices, taking out the seed; lay the pulp down in layers of salt for a day or two; put all into a stewpan, and add two or three shallots, or an onion or two, and Cayenne pepper, but a capsicum or chili would answer the same purpose; boil all for two hours gently, then put it through a sieve, then boil again for two hours or more. Now this is one grand secret in all preserves—if they are not boiled to evaporate all water out of the preserve, they never keep; but if boiled well, the preserve will keep for years. Some vinegar might be boiled with it, if you choose. The above simple way of making Tomato sauce does not cost much, and, as it should be, the apple predominates in flavour. No sauce in hot summer or any time entices other food down like it. Nothing improves a dilapidated stomach so much. It is a general favourite with the wealthy; but it is for the middle and labouring classes that I have thus been so particular in my description of the love apple.

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# CHICORY AS A WINTER SALAD.

The wild or uncultivated Chicory is to be seen all over Britain during the months of July and August, the stems rising to two or three feet, branching out with long dandelion-like leaves—the blossom of it is a splendid Prussian-like blue, forming a bright star-like flower, and flowering in clusters; but where the roots are cultivated, and planted in rich earth, the stems rise to six feet high, and form a large bushy and splendid flowering plant, keep in flower a long time, and would make no mean ornament in a border or a shrubbery.

The heaviest root I ever grew was three quarters of a pound, and the length fifteen inches—in fact, as large as a fine stick of horse-radish. The seed of Chicory is not unlike its relative, endive, and ought to be sown about the 1st of June round London, if the soil is light and in a warm situation; but should the soil be strong and retentive, it ought to be sown in the middle of May. I found out by experience, if sown too soon they run to seed, the object being to grow fine, strong, well elaborated, and well-stored roots. The ground being well dug, a drill is drawn a foot apart, the seed sown as parsley is, and about the same depth. When the plants are up, thin them out to one foot apart in the rows, leaving, if possible, the broadest pointed leaved ones. Nothing more is necessary than to keep them clear of weeds. Should any run to seed pull them up, as they would be useless for any purpose. When they have done growing, some time in November, the crop of roots are all dug up and stored like beetroot. In cutting off the leaves you must not injure the centre, for out of the centre comes all the salad.

In 1836 I had a quantity of mould put into a cellar, and planted a bed of Chicory roots as soon as they were taken from where they had grown during the summer. I planted 300 roots in the bed, keeping them four inches apart, light and air entirely excluded.

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# LIQUORICE.

The cultivation of this plant is but little understood in this country; it is grown in but few districts round London. All ground for this crop must be clear of stones, which would cause the roots to be forked and crooked, and thereby diminish their value. The subsoil ought to be sand or gravel, in order that no stagnant water might lodge about the roots during winter. To prepare Liquorice ground well, it should be dunged to the amount of from 40 to 50 tons an acre—depending, of course, upon the previous richness of the soil—and spade trenched to the depth of 4 or 5 feet, and laid up in ridges till the spring. In March the ridges can be levelled down, and prepared for planting.

The largest growers of Liquorice now round London are at Mitcham, and if any one is desirous of cultivating this plant he could not do better than apply there for stock. The underground stems or rhizomes are what should be planted. These grow horizontally about an inch below the surface, and never descend or come up. They sometimes push 3 and 4 feet in a year. They are furnished with eyes every 2 inches, which grow well the first year after planting. Every November these underground stems must be forked up, cut close off by the neck of the roots, and if fresh plantations are wanted they are cut into lengths of two eyes each, and wintered in heaps out of doors, covered with straw and mould, like Potatoes; but, if not required for planting, they are sold at once for some of the inferior purposes of sweetening; as, for instance, for beer. These underground stems are pithy, and not half so sweet as the roots. They are generally the size of a quill, and if they are not removed every eye grows along their whole length, and fills the ground with worthless Liquorice, completely choking the main crop.

A Liquorice plantation looks something like so many sapling Ash trees, about from 3 to 4 feet high, but sometimes they reach 5 feet, throwing out leaves every 4 or 5 inches. The stems are as thick as a middling-sized Willow, hard and woody; they are used for thatching sheds and lighting fires.

The proper time for cutting the stems down level with the ground is November, when the sap has descended, and the tops appear yellow. Those who have saved their underground stems for planting should put them in in March, in rows of 18 inches apart, and 9 inches distant in the row, something in the fashion of willow slips, or Currant or Gooseberry cuttings, only both eyes are left on. They are planted nearly level, say an inch below the surface. Nothing more is required except keeping the ground clean, and, as I have said, removing the underground stems every November for three or four years, until the main crop is lifted.

Ground at Mitcham costs from £3 to £4 per acre. An acre of three-year old plants will produce between 4 and 5 tons of good roots, and the price for the largest and best roots, as I was told, is from £60 to £70 per ton; smaller roots much less. A good Liquorice-stick is about the size of a well-grown horse-radish, although some are as thick as small parsnips, and 3 or 4 feet in length.

In taking up the crop a trench is taken out to the depth of 3, 4, or 5 feet, according to the nature of the former trenching; a rope is then tied round the top, and it takes all the strength a man has got to pull the plant up. The root generally breaks off, say a foot or so below the trenching; but, having no eyes, it never sprouts again. I have been informed, that the home-grown Liquorice is better than foreign; and if the acreage given above be correct, it must be a paying crop.

* * *

# RHUBARB WINE AND PRESERVE.

I CAN perceive that this wine may become of immense importance to this country in a commercial point of view. We can grow grapes no longer; even our gooseberries are unsafe, and the supply from our cider countries is uncertain; but Rhubarb is always at hand, and the enormous quantity from one acre that might be made into wine is almost beyond calculation. Cheap land at £2 an acre, and in any county, it matters not where, will produce it, and casks may be obtained readily. As to the mode of making it, the only recipe which is in my power to give, has been handed to me by a Mr. Brooks here. He says, "Bruise six pounds of Rhubarb stalks, add one gallon of cold spring water, let it lay five or six days, stirring it up three or four times a day, strain it off through a sieve, then add 4 lbs. of foot sugar and one lemon sliced; let this be well mixed. Care must be taken not to stir it afterwards; let it stand in this state for about ten days. It is again strained through fine muslin or a fine sieve; then put into the barrel for good. A small quantity of isinglass dissolved in the liquid must be added. An ounce of isinglass would be sufficient for a nine gallon cask; but as the wine ferments for several weeks, I think that the isinglass ought not to be put to it until fermentation ceases. The wine then is either bunged down or bottled off, and will be in prime condition for next summer's use. If a clear champagne is wanted, loaf sugar can be used." The above recipe is, no doubt, imperfect. Rhubarb juice, however, does not end with wine, for it makes a fine wholesome vinegar. This latter has been made by some party in town, but I cannot as yet find his whereabouts; a gentleman, however, had used it, and very much approved of it, discovering by mere accident that it was made from Rhubarb. As I before stated, the uses of Rhubarb are but beginning to be found out. In conclusion, I would advise amateur gardeners to commence growing it for wine on a large scale; if the land is not too rich so much the better, as then wine can be made from every crop of stalks, say at least three times during the growing season. Our London Rhubarb is full of water, and that is one reason why I recommend the wine not to be made till autumn; but if the plants are grown upon a poorer soil, they will always contain less water and more of the acid principle; and they can be converted at any time not only into wine but also into vinegar.

**Preserve.**—Rhubarb also makes a fine preserve equal to greengage plums, by boiling the stalks first half an hour, then adding a pound of sugar to a pound of Rhubarb, and boiling again for half an hour. A little marmalade or lemon or orange much improves it.

All preserving pots ought to be made of strong and rather green glass; this would save much trouble in examining the preserves during winter.

* * *

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THE AMATEURS'

# FLOWER GARDEN

## A PRACTICAL GUIDE

**To the Management of the Garden and the Cultivation of Popular Flowers.**

**By SHIRLEY HIBBERD, F.R.H.S.,**

Author of "Rustic Adornments for Homes of Taste," "The Rose Book," "Profitable Gardening," "The Fern Garden," "Field Flowers," "The Town Garden," etc., etc.

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*GROOMBRIDGE* & SONS, 5, Paternoster Row, London.

# A TREATISE

ON THE CULTIVATION OF THE

# CUCUMBER AND MELON

BY

JAMES CUTHILL, F.R.H.S.,

AUTHOR OF

'A PRIZE ESSAY ON THE POTATO,' 'MARKET GARDENING,' 'THE VINE,'
'THE STRAWBERRY,' 'THE MUSHROOM,' ETC. ETC. ETC.

*SECOND EDITION.*

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5, PATERNOSTER ROW.

# CULTIVATION

# OF

# THE CUCUMBER.

My Black Spine originated by chance, and it turned out to be an improved breed of the Southgate, which I grew at the Cedars, at Putney, for three years previously; its length was then about nine inches; afterwards I grew it at the Speaker's, Mistly Hall, in Essex, and as the family was large I required a good many lights of cucumbers to furnish the necessary supply. The seed I saved at Putney was sown here; whether it was owing to the leaf-mould that was here in quantities, in which my Cucumbers were grown entirely, or not, I cannot now say, but this Southgate increased inches in length; therefore, according to the custom of those days, I kept the secret to myself and called it Cuthill's Black Spine. The following spring I was invited to become a member of the Gardeners' Society at Ipswich, in Suffolk; at the first show there my Black Spine took first, second, and third prizes, as well as occupied a place in the best salad, which had two or three cucumbers in it—all the fruit being from twelve to fifteen inches long. Before this, a Mr. Smith and a Mr. Allen were cocks of the walk in cucumber growing.

After a lapse of about three or four years I came back to the neighourhood of London, and when located at Broom House, Fulham, I grew this cucumber in a new vinery the pit of which was full of old tan; the plants were trained up the rafters and they were watered with liquid manure. Fruit from this place was exhibited at Chiswick; fourteen were shown, the longest of which was twenty-one inches, and the shortest eighteen inches; all were short-necked, very dark green in colour, and carried a fine bloom all over them, the fading blossoms still adhering to their points. The medal I first took at Chiswick for cucumbers is still in my possession. The late Mr. Joseph Knight, then of the Exotic Nursery, King's Road, Chelsea, begged of my master and myself some seed, which was freely given. As for prizes gained by myself and others all over the country for this cucumber, their name is legion. The variety has since then undergone many changes, but still maintains a first-class position in the cucumber world, and no doubt is the parent of many new kinds. Such is a brief history, as far as I am able to give, of my Black Spine, concerning the origin of which I have often been questioned. I have, however, of late turned my attention to the improvement of another which I have called Prince Albert; it has blood of my Black Spine in it, and is an improvement upon Highland Mary, being longer and of a darker green. It is smooth, like Highland Mary, ribless, and, like it, most productive. Even of Highland Mary, Mr. Laing, Seedsman, Ballarat, Victoria, Australia, four years ago stated that he found it to be the very best cucumber he ever had seen; "I am not afraid of Prince Albert, or what might have been otherwise called, Highland Mary, improved." With regard to colour, ribs, and bloom on the skin of a cucumber, or cutting right and left at useless prejudices, I have never seen an article more to the purpose than the following, which appeared in the 'Gardeners' Chronicle and Agricultural Gazette:'

"To be eaten? or not to be eaten? That is the question. Is it for their prickles that cucumbers are grown? or for their ribs? or the bloom upon them? Or may it not rather be for their flesh, and its pleasant flavour? To judge from the angry reproaches addressed to us by an 'indignant cucumber grower,' complaining of a few civil words we lately addressed to a correspondent who sent us a handsome cucumber for approval, one would think that the look of this esculent is the only thing to be considered, and that its eatable value is quite beside the question. Since this is a practical question it seems worth a little examination.

"There are two distinct races of cucumbers;

the Smyrna, which has no bloom, no spines, no ribs, and is of a bright green colour; the Prickly, which has a bloom like a plum, spines either black or white, in the majority of cases longitudinal elevation or ribs, and is of a black green. The first has a delicate flavour, and is a sure bearer with everybody. The second, whatever its variety, and there are many, is less prolific, unless we include the degenerate 'Sandy' and its kindred, and is coarser. It is, however, the favourite in cucumber societies, because we presume it is so easy to get 'a big un,' as well as because when well grown it is certainly the handsomer of the two. We, therefore, admit its merit for showing, for if a man means to win a half-crown prize he has a better chance with a 'Prickly' than with a 'Smyrna.' But whereas ninety-nine gardeners in a hundred grow cucumbers for the use of a family, and whereas such cucumbers are usually brought to table sliced, we are unable to see what great advantage is derived from the prickles that are so much admired by the 'Fancy.' For this reason we venture to hope that we stand justified in refusing to speak ill of Mr. Cuthill's specimen called Prince Albert. What is more, we are presumptuous enough to recommence a trial next year of Smyrnas *v.* Pricklies, with a strong belief that the verdict of the jury will be for the plaintiff.

" It is time indeed to dismiss the prejudices that have been fostered by those who care for nothing that cannot be exhibited for the sake of getting money by it. For the existence of this feeling we admit that the worthy public is mainly to blame; for of late years all fruits seem to be valued by their size. The biggest melon, the biggest bunch of grapes, the biggest apple, the biggest pear, the biggest pine-apple, are triumphant. Fruit-growers seem, indeed, to have infected the ladies and even nations. To-day the biggest petticoat is the object of admiration; a few days before it was the biggest bonnet; to-morrow it may be the biggest sleeve; and so with our worthy cousins 'on the other side of sundown,' the biggest war, the biggest debt, or even the biggest 'skedaddle,' if we may indulge in Yankee elegance, are admired by this intelligent and independent people.

"Let us be more reasonable, and recognise once more the possibility of little things being better than big ones. Surely a little beechwood or green-fleshed melon is better than a huge Cantaloupe; one little ugly Kaisha apricot is worth a basketful of red Romans; huge magnum bonums cannot be compared to little greengages, any more than dropsical Lancashire gooseberries to little rough reds. In saying this we by no means wish to insinuate anything uncivil about the 'Heavies.' A fruit is not necessarily bad because it is big, any more than necessarily good because it is small. It is, however, a fact, we think, that for table fruits the small are for the most part better than the big. Nor is the reason far to seek. Bigness in fruit is caused by excess of water: for ourselves we prefer water apart from fruit."

My chief intention in the publication of this little pamphlet is to faithfully record my practice in cucumber growing. In the first place, therefore, my advice is always to sow new seed; never let it be more than two years old. If three or four-year-old seed is sown it often vegetates badly and irregularly, while some rots; and others push weakly. In some cases old seed may produce plants that will bear a little earlier than others, but with me the new seed plants have invariably proved the most early and productive, as well as the most healthy and lasting. So fruitful indeed are they that I am obliged to nip out the very early fruit, for if left upon plants only a month planted out it would weaken them too much. At one time I used to carry the new seed of both cucumbers and melons in my pocket to dry for fourteen days or so after saving it. I now, however, think that I was wrong, for by so doing I was drying up what nature had put into those small seeds, making them prematurely old. Weak plants were therefore the result, the reverse of what I intended; at least, I think that my plants are stronger from fresh seed than when I adopted the drying process. In building up a dung seed-bed, which even now is the best where sweet dung can be had, I make the bed at least a foot wider and longer all round than the frame; the advantage of this is that, if very cold weather set in, a lining can be applied against the frame so as to furnish a drier top heat, and that without increasing the bottom temperature when not wanted. My seed-bed is built upon a layer of brushwood, so that when more bottom heat is wanted, the warmth from the bottom strikes into the centre and increases the bottom heat. I do not now force early. Therefore my seed-bed is not required to be so deep of dung as before, but all other conditions are, and must be, the same; that is, sweet dung, sweet linings, sweet mould, clean pots, together with clean frame and clean glass. Not even a bit of slack lime, or a bit of fresh mortar as big as a walnut should be put in, or they will kill the plants. The gases evolved by them are highly destructive to vegetable life. This I ascertained many years ago by having pits built too late in the autumn, and heated by dung linings; in these every plant was killed repeatedly, until the mortar got hard and dry. When all is ready the seed should be sown in pans about three inches deep, in order that the roots may get direct to the bottom, for if sown in a deep pot or pan the roots are never half so strong or fibrous as in a shallow one. The mould used should be old cucumber soil with the addition of leaf-mould and a little loam. In my case, however, I am obliged to be economical. As soon as the plants are up and the seed leaves have separated, I plant into sixty sized pots, that had been prepared for the purpose in mould that had been heated. No crocks are used; one dry horse dropping is put over the hole in the bottom of the pot to prevent the mould from escaping. I never sift the mould. Two plants are planted in each pot. Unless the weather is sunny I do not give any water for two or three days, for fear of damping off. But of late I have found a good preventive—a fortunate circumstance: for of all damping off, that of young fresh potted cucumbers is the worst.

As soon as potted off, my plan is to scatter silver sand over the surface, just sufficiently thick to cover the mould. Sand is what is called inorganic, and what is called mould or damp cannot establish itself. Therefore after the first watering I again dust all over with silver sand. Until I found this out I dusted over the surface with mould dried in an oven, but it never answered like dry sand; because it contained vegetable matter and encourages what is called mould. The heat ought to be very moderate, for a few days, about 65 degrees, in order not to draw up the plants and make them long-legged. I have always given air, day and night; this is a great advantage to very young plants. In covering up at night let the mats hang over the ventilation. It is impossible to tell any one how much air ought to be given; this must depend upon the state of the heat in the bed and the weather; some nights one inch, on others half an inch, and on a cold doubtful night only a quarter of an inch would suffice. In the morning take the air away and give light as soon as possible by folding down the mat or mats to one third or one half of the light, according to the state of the weather; if your glass stands at about 60 degrees in the mornings, or not more than 65, you have managed well; high night heat is unnatural for most plants, and especially so for a very young cucumber.

When the plants want water it should be heated to about 70 degrees. Our plants are generally ready to plant out in from three to four weeks from the time of potting. Therefore the pits are got ready for their reception, by lime-washing them and killing all woodlice by means of boiling water. Our pits consist of forty-eight lights all heated by one boiler with a three-inch pipe running along the centre at the bottom of the pit, and a top pipe of four inches running close to the brickwork in front about a foot from the glass. The size of the pit-lights is six feet long by three feet eight inches broad. The depth of the pits below is five feet and a half, the front wall is four feet; they consist of four-inch walls, with piers of nine inches every three lights, every two lights would have been better. They have now been up these twenty-four years, and are not much the worse for the wear, though very roughly handled.

In describing my pits, I forgot the handles. They have two toes on each side, one fixing on the top, the other down the back with two screws in each toe, the handle being level with the top of light. The advantage is, in pulling or lifting up, there is no stress anywhere on the screws, neither can the hand be injured by pulling up. Handles are also on the front which save the lights from being twisted about, and glass broken, &c. These handles have been on these twenty-four years. Also to keep on the mats of a night, I have iron lengths, fifteen feet long, and one inch wide, two eighths thick, three for back and same for front of twelve lights. No nailing is then required. I used oak faggots at one time for bottoming when horse manure was scarce; they were merely covered over with long straw to prevent the mould mixing with the faggots. My cucumbers then were as good in growth as now with long dung. It is not the dung that gives me the bottom heat, it is the three-inch pipe that supplies all that is necessary. Many people have thought that one pipe was too little, but I have gone through early and very rough weather and the bottom and top heat have always proved sufficient. The dung is put in, say about a foot, all over the bottom. The mould is also put in, allowing eight good barrowfuls to a light, leaving it four or six inches higher in the middle; no more moulding is necessary. If roots come up, just let them grow down again. Some of our roots are running about on the surface like elm-three roots and very large they get by the autumn.

The mould to fill the pits with used to be brought from paddocks where sheep or cattle had fed for many years; therefore it was rich enough without more manure, and was put into the pits in a rough state. In colour it was dark and contained a fair proportion of sand; not loamy. Where fields existed houses and streets have sprung up. The mixture I now use, therefore, is about a third of Mitcham loam, a third of road sand and a third of what came out of the pits the previous year and two or three dozen of barrowsful of horse droppings, or very short fresh dung; all this is turned over once, about a month before wanted. For those who can get it, fresh field-mould, rather loamy, is always the best, and would be rich enough without additions. In my case after the mould is put in and everything ready, the boiler and pipes being full of water, the fire is set on for the season, the top and bottom heat will in three or four days have warmed and sweetened everything ready for the plants. What follows now requires great care. The plants I have to move have been brought up in a dung frame; therefore a pit heated with hot-water pipes would have too dry an atmosphere for them if provision were not made accordingly; for instance, when the plants are ready to be put into the pits and cold snowy weather sets in, a severe chill must be guarded against by carrying them in boxes covered over with a thick cloth. In this way I have had to move some four hundred pots, and was obliged to do it at once, as the heat of the seed-bed was all but gone. As soon as the plants are in their new place, the zinc saddles which had been placed thickly on the pipes are filled with water and all the steam created that is possible. In pits I never give air at night, as it would let off the steam, the very thing most wanted, and the heat of the pits kept low; the first twenty-four hours it should be about 60 degrees. If all has been skilfully managed the leaves next morning will have dew drops all round them and a bold healthy appearance. In two or three days the plants are planted out in the centre of the ridge. If a pot contains two plants that ought to be enough, but in case of accident I generally plant three under each light, the weakest is easily pulled out afterwards. A slender stick is thrust into the mould to each plant to tie up to and conduct it to the proper height, which will be about ten inches or a foot from the glass.

Their heads are now nipped off for the first time since sowing the seed. The trellis is then formed, resting it on long pieces of wood which rung along close to the back and front wall of the pit; strong cross pieces are afterwards put from front to back under each rafter; then stout hazel rods an inch or more in diameter are laid on the cross sticks four or five inches apart. These form the trellis, which when finished is about ten inches to a foot from the glass. The greatest torment in former years was woodlice; but since I found out the hot-water cure, their destruction is easy. Woodlice retire as soon as daylight appears; that is to say, in early spring, as soon as the mats are taken off they run into the cracks between the mould and brickwork. It is then easy to pour boiling water along the walls or frame; by repeating this operation two or three times before the roots of the plants grow out near the wall there will be few left to do any harm. The same can be done in mushroom houses on a plan which is described in my pamphlet on Mushroom Growing.

I forgot to mention that in planting out, the plants are inserted in the mould down to the seed leaf. Water heated to about 70 degrees is given to each lot to settle the mould round the stem and roots. The pits are kept up to 70 degrees by day. They stand at 60 degrees in the mornings ; as the plants get stronger and the day lengthens, heat is increased. But always follow the law of nature by lowering the heat at night. When once on the trellis the shoots are nipped off just before the fruit all the summer. If this is not attended to the trellis would shortly become covered with fruitless shoots; on the contrary if continually nipped off the fruit shows at once, and in about a month after I plant they are covered with fruit. When the plants cover the trellis and begin to bear fruit I apply as much liquid manure as will not discolour the leaves and fruit, and water over the leaves always with water having the chill off, and soft water if possible. If pump water is used it ought to have been exposed to the air to soften it beside taking the chill off by means of hot water. Even in midsummer the water I use is always exposed to the sun and air; I know too well that canker, mildew, and gout proceed from careless watering. Again, watering ought to be done, not later than three or at most half-past three in the afternoon; then shut down in order that the glass may rise to 90 or even 100 degrees; if sprinkled daily using about half a gallon to each light will not be too much, but half a gallon would be too severe a watering daily if not done as above directed even in hot weather. I never give air in front of the pits, always at the back; not by tilting, but by pushing the light down; by so doing a more humid atmosphere is kept up. Currents of air are as bad in a cucumber frame as in a vinery. As the plants advance in age, the more heat and moisture they will require. I shade directly over the plants when young, but after they become strong and get into bearing they do not require it unless during very hot days and then only for two or at most three hours. But after three or more days of damp sunless weather, shading must be attended to. Not only the burning of the leaves but a bright sun disorganises the accumulated and over-gorged tissues of the plant, producing mildew on the leaves, and what is worse, a disease in the fruit—an oozing out here and there in the skin. It is called the gum disease. The cure for this is more heat and down-right starvation. Stopping the supplies in sunless weather is a preventive which is better than cure. It appears that cucumbers always do best on trellises, this is owing to the continued circulation of air playing constantly around them. As the month of June advances fire heat is gradually and slowly diminished. But should the weather continue changeable and cold it is necessary to keep up a slight bottom heat.

I have but little to say about insects that sometimes infest the cucumber—such as red spider, thrips, and green fly. The last is generally introduced by green-house plants or cuttings infested by it. Red spider is I believe always present in mould got from where grass has grown, and if a dry atmosphere with plenty of heat is kept up it soon starts into life by the thousand. Thrips is also a field pest, it increases also under favorable circumstances as rapidly as the red spider. Both breed and live on the undersides of the leaves at first, and the more a gardener neglects his duty the better it is for the propagation and cultivation of these insects. I have had these two destructive pests many times, but I confess that it was my own fault in not beginning properly at first. I repeat that if frames or pits are sprinkled daily as I have already advised and a dew is created on the plants opening the breathing pores and inducing a vigorous leaf action—I say if this is attended to, and above all things a low night-heat is maintained, all cucumber insect pests will be unknown provided no weed of any sort is allowed to grow up in the mould. Pure tobacco with a little Cayenne in it is certain death to green flies, and no doubt the same application will keep the other two annoyances in check, but I have often thought that the breathing pores were too small to admit enough to kill them. It is a difficult thing to apply liquids under the leaves of plants, and what kills the insect stops up the pores of the plant. Therefore do not let breeding take place at the beginning, but if it does, smoke from tobacco and Cayenne pepper is the only thing to get everywhere, where a wash cannot touch. Any person could grow capsicums, which, for this purpose, are the same as Cayenne. A very simple plan of smoking a small greenhouse, pit, or frame, consists in soaking brown paper in a strong liquid of saltpetre, drying it, and laying it by for use. When you want to use it spread out a sheet of it and have some shag tobacco that had been dried a little, spread all over the sheet; sprinkle a little Cayenne pepper or Scotch snuff, set light to it and it gradually burns of its own accord. I have a great opinion of Cayenne burnt, and being a vegetable substance it cannot hurt any plant if used with ordinary caution.

One thing I do annually, that is, I burn stick brimstone in the pits about two days before the plants are put into them. Brimstone is, however, such a dangerous article that I am afraid to mention it in case some one might misunderstand me; it must on no consideration be burned where any living plant is present. Its fumes are the best purifier and sweetener of walls or frames with which I am acquainted; on account of them getting into every crevice, as well as killing every living insect within their reach, no person should attempt to put plants in a frame purified in this way until the fumes had entirely passed away. I am, however, convinced that if the rules laid down and practised by me, as well as doubtless by many others, are carried out, insect pests will be few and far between. I have had something to do with three vineries in the grounds of William Scorer, Esq., Champion Hill, for several years, and I have seen neither red spider nor mildew in any of them.

As this treatise is intended for the use of the amateur and young gardener as well as for those who occupy little market gardens round towns, and who have only a hot dung frame to grow their cucumbers in, a few further remarks may be necessary. All the practice of raising the seedlings, already described, must be attended to in the seed frame. The fruiting frame can be got ready by first laying a bed of brushwood or logs to raise it up in order that less hot dung mixed with leaves may be required. This foundation, whether for two lights or three, ought always to be about eighteen inches wider and longer than the size of the frame, and for the same reasons as I have described in the raising of plants for early work. The bed should be made up with sweetened dung to the depth of three or four feet, depending of course whether it be the end of February or the middle of March. It must always be borne in mind, that what the frame rests upon must be higher by nine inches than the general level of the inside, for if this is not attended to the frame will sink down and the leaves of the cucumbers get bruised against the glass. I wish particular attention to be paid to this, not only in cucumber frames but in melon frames also; the further the plants are kept from the glass the more heated and healthy air there is, and the better they thrive.

The mould is put in, not in the form of a mole-hill as the old-fashioned plan was, but in a ridge about six inches nearer the back than the centre of the frame, to the depth of ten inches, and the same, of course, in breadth. The mould should not be put into the frame until the violent heat in the fermenting material has subsided, a point ascertained by keeping a trial stick thrust into it. When the mould gets warm, plant out two or three plants under each light according to its size; water to settle the soil about the roots. Plant up to the seed leaf. Where seed saving is not cared for it is a good plan to have various sorts, provided they are a good breed, in order always to have a cucumber to cut when wanted. In dung frames the plants are stopped from the beginning, and are never allowed to ramble about; on the contrary, they are continually stopped in until fruit appears, then stop again just before the fruit in every case; if this is attended to what is called knife-pruning will be unnecessary, because the fruit will check over-luxuriance. Above all things make a difference between night and day heat. By way of illustration, I may here mention a plant in which if topping is not attended to fruit-bearing becomes almost suspended, viz., the Tomato. In the hands of a market gardener this plant is, by continual pinching, most fruitful, and the operation is done in this way; as soon as it is up and has pushed a shoot beyond the seed leaf it is topped. It pushes again and it is topped, and when two shoots are produced the tops are nipped out and only these two leading shoots are allowed on a plant. By this sort of training they show fruit at every eye and the plants from bottom to top are one row of clusters of Tomatoes and they are generally about three feet six inches in height. Mind, this is a most unmanageable plant to fruit if left to nature, and so is a cucumber plant if attention is not paid to it.

To return to the cucumber. As the roots appear through the ridge, more warm mould should be added—whether much or little will depend on the season of the year. Remember that the ridge should be highest when the whole of the mould is put in. Air should be given, day and night if possible; nothing is so much against a healthy development as shutting up for a length of time. At night the mats will overhang what air is given; therefore no wind can hurt the plants. Very early fruit must be set by taking off a male blossom and inserting it into a female one, the morning when first open; this should be done about eleven o'clock, after the blossoms get dry. As the season advances this becomes unnecessary, as increased currents of air and insects do the work perfectly without other assistance. As the plants grow do not peg them down, and do not allow them to make fresh roots at every joint; do not listen to the old school upon that point. Its upholders say do not plant more than two in a hill, and in the next breath add peg down; you see you would soon have fifty distinct plants in a light, you cannot peg down on a trellis, yet observe, how well they do on their original root. The old plant is to overcrop and quickly to exhaust a rich soil producing worthless fruit and barren plants long before autumn arrives. I have forgotten, I fear, to mention that if the shoot of a plant is pinched off behind an eye at the axil of a leaf, that shoot or branch seldom breaks or shoots again, and is lost.

Market gardeners round London generally grow cucumbers upon dung frames. Their beds are built in this way. The ground is marked out and the beds put up in rows about one hundred yards in length; they are about three feet six inches deep in the back, and about nine inches less in front. The next bed is of the same length, running parallel to the first, and is about four feet distant from it, and thus the beds are continued according to the requirements of the grower, always allowing the bed to be made larger all round than the frame. These beds are generally all made up in March. When linings are wanted the space between the rows of beds is filled up with dung, so as to make the whole a level mass of heating matter that will produce bottom heat all summer. The after-management of these beds is simply a repetition of what I have already said in reference to a common dung frame.

The only way to perpetuate a high-bred cucumber is by cuttings, which cannot be done in many places. Another thing is, that cuttings are not so long-lived as seedlings are; this is partly owing to allowing them to bear before their strength is well established. One year I tried to bud my Prince Albert on strong plants growing in twelve lights, Dr. Livingston's and Hamilton's Favorite having failed to prove their high character with me. But a cucumber bud is so soft that although plenty of water was applied the experiment entirely failed.

* * *

# CULTIVATION

# OF

# THE MELON.

Any one who perfectly understands cucumber growing can easily manage the melon. A melon plant requires a stiffer mould to grow in than a cucumber; for although I have grown melons very well and also high flavoured, in a mould of as light a character as that used for cucumbers, and have likewise grown them in old brick rubbish, yet as a rule a stiff soil is best. If you cannot get the proper mould for either a melon, a cucumber, or a strawberry, one must be made; if too light and sandy it can always be rendered stiffer by treading. This

I have practised not only in pits but also out of doors. The rising, potting, and young growth up to a month old are so similar to those of a cucumber that I can add but little under these heads; the only thing is if the plants are trained on the mould instead of on trellises, they must be stopped about twice before planting out. When I came here (which is twenty-four years ago) I sowed on the first of February and planted out on the fifth of March or so. The seasons then were, however, somewhat different from those we experience now. A twelve-light pit was got ready in the same way as for the cucumber and furnished with hot-water pipes. In putting in the mould I kept the centre higher than the rest of the surface by six inches. I always found that the plants throve better about eighteen inches from the glass than at any other distance from it, no doubt on account of more pure-heated air having accumulated there. In planting out one plant grows to the back half and the other to the front half of the light; three leading shoots only should be left on each plant; when the shoots reach to within six inches of the back wall or frame, and the same from the front, they should be stopped by pinching off their heads. They soon push outside roots and upon them form fruit, stop the side shoots one joint beyond the fruits; as soon as the flowers are open let them be set or fertilised with pollen from a male flower. The perfect and most promising fruit will soon be indicated. Pick off all except about six fruit if there be two plants to a light; that will be three fruit on each plant; if three plants, two fruit. The knife ought never to be used in pruning. Where it has to be employed it shows bad management, as it also does in the case of the cucumber. If in hot water pits keep up plenty of steam; when watering is required and after the fruit is swelling diluted manure water is best, but I always preferred sprinkling daily, heavy watering was not then wanted; above all things do not water their centres for fear of canker. A melon cannot have a good flavour when ripe if the plant has been allowed to become unhealthy. When the crop is ripening off, every leaf ought to be in robust health; you must not be impatient of its ripening, because under the best management a fruit takes just a month to perfect its seeds, and the moment the seeds are ripe nature has done her work. A melon plant will thrive in a heat varying from 70 to 75 degrees top and bottom, allowing a rise of from 80 to 90 by means of sun heat. By strictly adhering to what has just been advanced, I have, year after year, cut twelve lights of melons from the fifth to the tenth of May, and all were sold in Covent Garden Market. When the fruit had ripened off I have tried cutting back and growing a second crop on the same plants. But that plan did not succeed half so well as having healthy young plants ready to replace the first lot. I may mention that I was the first who took a Banksian medal from the Horticultural Society for a melon cut on the 10th of May and exhibited on the 13th. After that year the shows were altered to a later date. I can well remember looking round the tables to see if there were any more than mine present, frightened every step I took, but much to my satisfaction none were exhibited. Dr. Lindley complimented me on my success; although, however, I own that my early melon-growing served my purpose and was profitable, to have good flavour a melon must have a June or July sun.

Market gardeners grow very good melons, but few of them grow them early. They are planted into common frames after early potatoes, French beans, or any other early crop : in this way they produce fine and excellent flavoured melons about the end of July and beginning of August without any top or bottom heat, except what is afforded by the sun. Long before this time, however, the Dutch and French ones are in the market. A Dutch melon is cut as soon as it has attained its size, just one month before being naturally ripe. How then can it have flavour ?

Owing to cucumber plants being every year raised from seed it is almost impossible to keep them true to their respective kinds, and in a trial of cucumbers to see which is best, one plant of a sort will not give a fair result, as the very seed employed for the purpose might happen to be different from the main stock, and perhaps produce the worst specimen of the whole packet. As a proof of this I have always been obliged to pull up one or two plants out of a twelve-light pit which happened to come contrary to kind; in fact it is almost impossible to get two fruit alike, even on the same plant. I have grown many twins on the same joint; both flowered at the same time and kept the same length, but in some points one was always different from the other. Some twelve years ago I exhibited a brace of twins, both hanging from the same joint, at the Horticultural Society, in Regent Street. They were nineteen inches long; one had no neck and was very handsome, the other had a neck four inches in length and was much more ribbed than the other. It requires long practice and a continued study of the laws of nature to get even at a slight understanding as to why such changes take place. Therefore a good judge must not only be a good practical, but also a scientific gardener.

Ridge, or hand-light cucumbers, are grown in various ways; I always found it the best plan to make a ridge of hot manure running as close as possible in the hottest part of the garden, not digging out a trench, but placing the dung on the surface and covering the ridge over to the depth of nine inches with the surrounding mould. I then placed the hand-light six feet apart on the centre of the ridge. Plants that had been topped two or three times should be planted out not fewer than two or three under each hand-light. They should then be watered and shaded on the south side. Straw or long litter should be spread all over the ridge, not only to keep the fruit clean but also to keep the ridge in a medium state as to moisture; too much water in this case would prove destructive to the plant, especially during seasons such as we have experienced these last ten years round London. When the plants require to be let out from under the hand-glasses it is best to place each corner on a brick or pot; after this is done no top air need be given. Should the plants require watering, do not, above all things, do it too late in the afternoon. Mind, it is cold and damp that form the commencement of cucumber diseases. Withhold water from the centre; only give a sprinkling. If mulching is done properly very little watering will be required. The mulching keeps the roots near the surface; in such a situation they get more heat and air. The tops ought to be nipped off, as is done in frames. This ought to be attended to, if not an over-luxuriance is induced, and they only show fruit here and there. By the system just described, I have grown, in former years, fine crops of Black Spine. Prince Albert, I think, will make a good ridge cucumber, as it is very hardy, and in the midst of its growth less liable to be seedy or deformed than most kinds; it is also one of the most solid and best flavoured cucumbers known to me.

I have now arrived at the conclusion of an attempt to describe a lengthened practice upon one of the most useful plants in cultivation in this country: a plant the successful early growth of which was, at one time, looked upon as something grand. I had an uncle many years at Aikenhead, near Glasgow, called Cucumber Johnny. Perhaps I may have inherited my cucumber propensities from him. Be that as it may, however, I have been very successful, and I must say there is a latent something that cannot be taught or described; it may be called mature experience gained by long practice.

I may just state, inadvertently, that the British gardener will never be beaten in growing the best flowers, fruits, and vegetables in the world. I saw enough at the Great International Show of the Royal Horticultural Society to convince me of that fact. No doubt our success is owing to the extraordinary vicissitudes of our ever-changing climate, as well as owing to the great encouragement given us by the wondrous wealth of this great country. I confess that my liking for the melon and cucumber during the last forty years has been excessive, although I never ate one or the other. Since I have been here, I have had the honour of serving all the principal nurserymen and seed merchants in and round London, annually, with my cucumber seed, and without a murmur for these twenty-four years. That is rather a long character with things so liable to be altered.

All fruits, flowers, and vegetables can only be improved by saving the seed of one that shows a superiority to its parents. This can only be done by high and careful cultivation. Here I must give the market gardeners very great praise for keeping their things so true to kind. They are well aware of the deterioration of seed if they saved it, such as cauliflowers, brocolies, cabbages, &c., all in the same year. They know that a worthless mixture is the result. And even in my case where I only grow two or three sorts of cucumbers, and each sort in a twelve-light pit, and though guarded against insects, with every precaution, I can hardly keep the sorts true. Great knowledge can only be gained by a lengthened experience.

I have been writing much on the training of the cucumber, let me for one moment tell the young gardener to train himself while young. Load the memory; then a time will arrive when this early training will produce good fruit; once allow the golden hour to depart it can never return. Read and study every work connected with your business; do not grudge the expense, it will pay you fortyfold. Never allow your master or mistress to be in the secret of something new which you are not.

# HAVE GOURDS AND CUCUMBERS BOTH CALYX AND COROLLA?

"BOTANISTS are aware that the great Jussieu was of opinion that the brilliant yellow cup which in Melons, Gourds, and Cucumbers forms so conspicuous a part of the flowers of such plants, was a calyx and not a corolla. The five green processes external to this cup, and occupying the place of a calyx, that eminent systematist pronounced to be merely appendages; comparing them possibly to the small bracts that adhere to the calyx of a Strawberry. He has followed Auguste de St. Hilaire, and probably others, though not in this country. Hitherto the true nature of these parts has been a matter of opinion rather than a point incontestably established. But no doubt can longer remain after considering such cases as those here represented, for which we are obliged to our sharp-sighted correspondent Mr. Cuthill, of Camberwell. The figures demonstrate that the apparent calyx is really such, the sepaline lobes having grown into true leaves, while in the smaller figure, which represents a male flower, the corolla remains absolutely unaltered. The specimens* sent us exhibited several intermediate conditions of structure; but nothing more instructive than what our artist has represented. The monstrosity occurred in a common cucumber."—'The Gardener's Chronicle and Agricultural Gazette.'

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* These beautiful specimens were sent to Dr. Lindley, August, 1859.

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# A FEW HINTS ON HORTICULTURE.

## I. Economy in Cucumber Growing.

An old lady called upon me some few years ago. "Well, Mr. C—, I am told you are a good cucumber grower; but you don't know everything now. Have you ever cut off as much as was wanted and left the remainder to grow bigger?" Never; I thought it would bleed. Not a bit of it; she was obliged to adopt this plan, on account of her servants devouring up her cucumbers that had cost her so much; her coachman and self being the gardeners. I cut a cucumber about half off. Strange to say, it did not bleed; the remainder swelled fast; this was new to me.

## II. Professional Career.

To clear up the doubts of young gardeners about my experience: In 1812 I lived for four years with Mr. Smith, of Deanston; in 1816 or so I went to Mr. Kirkman Finlay's, of Castle Toward; served my two years' apprenticeship. Went to Auston's Nursery in Glasgow; then to Arthurlie House; then to Eagle Henderson, Lord Provost of Edinburgh, and nurseryman. Off to London in 1823; stayed at Wyke House, Brentford; then at the famous plant place at Ewell; then off to Earl Chichester's, Brighton; then New Cross Nursery; then Lady Grantham's, Putney Heath; then Ashburton House, next House; then Kensington Palace; then Lord Herrington's, Putney; then the late Archbishop of Canterbury's—he was then Bishop of Chester; then the Speaker's, Mistly Hall, Manningtree, Essex; then an enormous forcing establishment at Ipswich, where my health gave way; then at Knight's Nursery; then at the Right Hon. Mr. Sullivan's, Broom House, Fulham;

then Dyrham Park, Herts; then Knight's, Chelsea; then Lord Middleton's, Pepper Harrow, Surrey; then here. This account may appear most extraordinary to many; such was my run of bad luck; all perhaps for some wise purpose, for I never had an angry word with any one. I have not mentioned Sir Francis Burdett's sister, nor Mrs. Bulwer Lytton, of Knebworth Park, where I tried to stop; since these days, in 1839, I came into this place—that is all I have to say about myself.

## III. Solid Brickwork Pits.

I believe that I was the first to build solid four-inch brickwork pits, with a trench of two feet all round, to hold the dung or heating matter—a great improvement upon the McPhail pit for the simple reason—I had not to waste the heat in sweetening the dung. At that time people thought heat could not pass through solid brickwork; my experience in solid brickwork might have been gained by my once living where acres of tree leaves were annually gathered and put on the north side of a wall, where on the south side were figs, cherries, peaches, &c.; they always came into flower and fruit first, and were ripe long before others, on the same wall where no leaves were behind. Lady Peel told me, twelve years ago, that at Lord Grey's, in Perthshire, there were ripe peaches, &c., on the walls; when she left Drayton, in the south, not one was ripe, the walls were flued and heated by fire. It matters not whether it is dung heat or fire heat; any heat goes through solid work. I have a mushroom house here with a pathway down the middle, where hot dung is put in to send a heat through into the beds; on one side is wood, on the other a nine-inch brick wall; the heat goes through and brings the mushrooms up by the bushel on either side. But the most extraordinary and conclusive case is proved by our market gardeners, in the forcing of seakale at Christmas: here is an acre of beds planted with thousands of roots, in solid cold earth five feet broad, with a trench three feet broad, and three feet deep, filled with dung, and the heads simply covered by first a mat, then a foot of stable straw, nothing else: the finest seakale is the result. Heat, well managed, is everything. See my 'Market Gardening' published by Groombridge and Sons, of London.

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# CULTURE

# OF

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AS PRACTISED BY THE AUTHOR;

SHOWING HOW TO OBTAIN EARLY AND LARGE CROPS
OFF A SMALL PIECE OF GROUND.

BY

JAMES CUTHILL, F.R.H.S.,

*Author of 'A Treatise on the Potato,' 'Market Gardening,' 'The Better Management of the Vine,' 'The Cultivation of the Mushroom,' and 'The Cucumber and Melon,' &c. &c.*

Fourth Edition.

LONDON:
GROOMBRIDGE AND SONS,
PATERNOSTER ROW.

# STRAWBERRY CULTURE.

Strawberry growing has rapidly increased during the last twenty years. It is scarcely thirty years ago that the author of this, when found by his employer watering forced Strawberries with a strong manure water, was threatened with dismissal, if he used any more of that nasty fluid for his Strawberries! This same employer, only about six years ago, remarked how vastly things had altered; adding that he much approved of liquid manure, and that the author's case was not to be compared with that of the old Dutch gardener, who came over to England in Queen Anne's time, and settled on the Grosvenor estate, between Vauxhall and Chelsea. The Dutchman knew that unless the refuse from the ground was again put back, the crops must fail for want of nourishment. An action-at-law was commenced against him; but the landlord forgave him, provided he would not again poison the land with his filthy stuff!

The Strawberry, up to the time of the Dutch gardener's arrival in England, was called *Woodberry*. One year a very heavy hailstorm came over London, and spoiled all the *Woodberries* with grit and mould; next year the gardeners laid straw under them, and, from that time, they have been called *Strawberries*.

This most delicious and wholesome fruit is very largely cultivated for the London markets, and more fruit is even consumed in the villages surrounding the metropolis than in the largest provincial town in England. It is indeed difficult to discover the correct acreage devoted to the growth of this delightful fruit, in the suburbs of London, but it may be fairly estimated to be about three hundred acres.*

In the cultivation of the Strawberry I have tried every plan that my experience suggested, up to the present time.

The ground should first be trenched three or four spades deep, and then be trodden down very firmly again, and a very heavy covering of horse-manure put on—barrowful touching barrowful, which is then to be dug in, and the ground again trodden down very hard; so much so that one Irishman, some dozen years ago, said to another, "What is the use of trenching the ground, when master will have it made as hard as it was before?"

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* *Vide* "Market Gardening."

I am much in favour of keeping the manure near the surface; so much so, that I have been trying the plan just ten years, upon a border about two hundred feet long. This Black Prince border has not been forked or dug, but plenty of half-rotten manure put on every February. The crop of Strawberries off it every year is large and early. The first Strawberries have generally been ripe from the 25th to the 28th of May, for several years past; when I have begun selling them at *one shilling an ounce*, and have sold them in Covent Garden at *five shillings per pound.* I merely mention this to show that by this treatment the border does not go back, as one would naturally suppose.

Another border that was planted when I first rose my *Prince of Wales*, in 1849, had not been trenched or dug till the Autumn of 1859. The *Princess Royal* has also been subject to the same culture for years.

It must be borne in mind, that my ground is very light, and, therefore the more compact it is made the better the Strawberry thrives; still, it is necessary to dig in, after trenching, a fair proportion of stable manure, for the young plants to root into; but after they are established, the manuring on the surface is best for many reasons, not only for the Strawberry, but for other crops also. This is the reason, that in any light chalky, or light sandy soils, why they do not bear, if the soil before planting is not trodden down very hard, also trodden round the plants after they are planted. Let it be remembered, I am not speaking of a strong clayey soil, for in that case the less treading the better. Rain and watering will make this soil firm enough.

To prepare the runners and get them strong, as early as possible, for sending out as soon as the fruits of the various sorts are all gathered, the ground between the beds is cleared of weeds, and as soon as the runners meet and become numerous, I scatter mould over them, not being very particular about covering the shoots, as they soon push themselves through again. The great advantage of this very simple process is, that the runners strike root at once; and, in a short time, my plants are finely rooted, which hundreds of gardeners, in all parts of the country, well know.

In taking up the runners for my own planting, I am not particular whether they are first, second, or third on the same runner, so long as they have good roots, they all bear the next year. This plan, I admit, would not do for Queens, or other large growing sorts.

I have used no other than stable manure for twenty-five years upon my ground, with the exception of salt and soot, when I grew ash-leaved potatoes. I may, however, be wrong in thinking that this sweet manure imparts a better flavour, not only to the Strawberry, but to most other fruits.

Having met with so many disappointments with *Keen's*, even with the greatest care, I have made it one of my fundamental principles to propagate from the Black Prince, with, at all times, a mixture of the Queen with the others. The result of this is that, with every succeeding seedling, which I have retained, they are, to say the least, enormous bearers, with a certainty of a heavy crop every year.* But, say some fruit judges, there is no *Queen* flavour, for instance in your *Prince of Wales*, none also in the *Princess Royal of England.* It possesses a sort of pine-apple flavour.

In April, 1859, my longest border, which had been trenched four spits deep during the winter, and well surface manured, (being slightly dug in) was planted with equal proportions of my three sorts (about two thousand plants). They were carefully taken up, so as not to injure the roots, and planted upon the box-edging system, with the roots carefully spread out along the line, and filled in with the hands, made firm with the feet, and once watered. They produced as fine a crop as ever I had from autumn planting. I merely mention this to show what my sorts are capable of doing when they are well treated.

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* Mr. John Wormald, of Yorkshire, says, "The strawberries you sent me have done well; but there is one sort I like much better than the rest—I do not know its name—but I believe I could grasp fifty or more, all ripe, on one single plant. I never saw such a bearer." This is my Prince of Wales.

In dressing the runners for planting out, I have discovered, that in pruning the plant attached to the runner, the end nearest to the mother, or old plant, ought not to be too closely pruned. I have generally cut it off one inch from the plant. Such close pruning as this causes disease, should the weather continue wet; for the runners so closely pruned cannot perform their wonted functions: neither can they if too much water be given to them. In either case, the end, if cut off close, is, of course inserted in the soil; the moisture gradually, but not immediately, finds its way up the vessels of the runner, or the now independent plant; for it must be borne in mind that the runner still forms the nucleus of a new plant, and if the damp or disease still goes onward till it arrives at the core of the plant, then death must follow. And to prove this let a sickly plant be taken up—say a month or more after planting—it will be observed in all cases that this part, where the runner was cut off, forms a hollow tube, and if the centre of the plant be cut through, the cause of disease will at once be apparent. To avoid this the runners ought to be cut long enough, so that the cut end should be out of the soil when planted.

In order to prove what I have said, take up a healthy plant: it will be seen that the end where cut off is green and has not rotted away.

I have not found any wireworm in the diseased tubes leading to the centre of the plant.

Those plants sent to the country, by myself and others, are less liable to the disease, on account of the runners having been pruned some time before they are planted: they get more dry and healed over, (like the cutting of a scarlet geranium skinned over,) which ought always to be made several hours before pricking out. I never cut the leaves, nor yet the roots, nor at any time cut or mow off or remove the dead leaves. This practice of cutting off, I have condemned for nearly thirty years. I have never observed any disease in runners, when they were allowed to run and root naturally, and form their own plantations from the parent plant between the old rows.

Plants that have been long established and are still attached to the mother plant, the string or internode between the young plants, gets more hard and firm, the pith or string is less liable to rot, especially in the case of late planting out.

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## PLANTING OUT.

Now for planting out. The beds are two feet six inches apart. The first row will explain all the rest. It is cut out by the spade, as if for box-edging. A little loam or clay is scattered along the line the plants are to be placed, with the roots stretching out lengthwise, combed out if you like, eight inches plant from plant in the row, with the crown rather above the surface, so that when the row is filled in with the hand and trodden with the feet and then watered, the crown of each plant will be level with the surface. (Remember that a forest tree may be killed by deep planting.) The second row is about eight inches from the first, or a third or fourth, as the case may be. This is my practice, as I want a large crop off a small plot of ground, the first year. Measure again two feet six inches from the last bed, to form the second bed, and so on.

This plan gives the numerous roots available food at once; while, on the other hand, the dibber crushes the roots all into a hole, glazing or hardening the sides of the hole, so that it takes a long time for the plant to recover itself, besides injuring the roots. A dibber is only fit for plants forming fresh roots, what is called pricking out; neither am I so particular to plant so very young, as the plants are growing fast; but I am very particular in having everything ready when a good opportunity offers itself, such as a dull, rainy day, &c.

The second year, if I do not require the plants for the country, the alleys or fallow ground between the beds are covered with runners; those are upon fresh ground, and being young plants bear a large crop of fruit the next summer. The runners plant themselves.

Some may say that a fruit is not so good when closely grown. That is a mistake, at least with my sorts. All fruit depends upon the leaves for the flavour of the fruit.

I have a melon prize medal in my house, from the Horticultural Society of London, obtained some twenty-six years ago: the fruit was covered with sand for a month before it was ripe, and the sun entirely excluded from it.*

Leaves are the lungs of plants, and on them depend their health, and the quantity and goodness of the fruit, even down to the fruit of the earth—the potato.

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* *Vide* "Loudon's Magazine for 1837."

For Strawberry plants, when established, spring is the proper time for manuring and mulching. This is making the surface rich when the plants most want it. And this is a most particular point. The horse-manure is prepared by turning and rotting the straw until it is about half-decayed. And any time during February, or early in March, about London; in case of a wet spring, it is more safe to mulch in March; in the north, April would do. The manure is scattered on by the hands, or otherwise, being very particular to spread it evenly all over plants and alleys to the thickness of two inches. This manure or mulching becomes by exposure quite sweet; and by means of dews and rain, is continually parting with its riches to the plants when they most want assistance. The mulching, long before the fruit gets ripe, has assumed a dark colour; and instead of being a reflector, as clean white straw is, it absorbs the sun's heat, retains it, and makes the fruit ripen at least a week earlier than it otherwise would do. I have now practised the plan of mulching with fresh manure from the stable these twenty-five years; but formerly I put it under and around the plants when they were in or coming into flower. But this plan took much time, and did not realize half the advantages of that recorded above. Until lately, we gardeners have been afraid to mention manure, either in a solid or liquid state; just as if the earth, as by magic, could produce its riches continually, without being fed. Prejudices, such as these, are, however, fast giving place to common sense and sound reason.*

Thanks to Alderman Mechi, and others, this manure question has now been freely ventilated. Were I to tell a farmer, that the time will come, and is not far distant, when surface manuring will be carried out on the farm as well as in the garden, his answer would be, "Impossible." The word impossible will, however, no longer do for one who has lived for twenty-five years upon a plain acre, at now, forty pounds a year—a great rent. Were I to tell him further, that by a proper application of surface-manuring, he might save his turnip-crop from black fly, his answer would again be "Impossible." He would also say, "I have been told that something has been said by a clever Scotch-American about surface-manuring." Why did not our Transatlantic friend frankly acknowledge that he took the idea out of Cuthill's pamphlets?

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* *Vide* "The Gardeners' Chronicle."

I may here warn people, however, that if the plants are manured after the crop is gathered, the result will be an immense crop of foliage, and a late growth with the buds not ripened before the frost sets in, and there will be less blossom next year.

Autumn manuring, or mulching Strawberries, I consider to be an evil, and for this reason: that after a long dry summer and autumn the ground has had a rest, and the riches of the earth have increased by dews, with occasional showers. When, therefore, rain does set in, nutrition is sometimes more than sufficient; so much so, that strong growing sorts such as Keens and Queens grow so strong, and so late, that their centres have not time to ripen the buds.

I have applied liquid manure during the winter, (at this time the plants are at rest), and it cannot do any harm to any fruit-bearing plant; but, on the contrary, it enriches the soil, and lies latent until wanted.

The last year's beds are cut away with the spade in the autumn, or pulled up by the hand. This plan gives a rest to the soil, alternately. But where I have so many young plants to send off every year, I cannot always do so, and the old beds then last for two years. But when it can be done every alternate year, this plan is the best with my sorts; but it would not answer with strong growing kinds, unless in a very stiff soil; or if a light sandy soil it must be hard trodden down.

By my bed system I get the largest crop from the smallest piece of ground: so much so, that those who have been here from all parts of the country have been quite astonished. Should the season be very dry, the plants are more easily watered. Should it be wet, the season is prolonged, and then the only difficulty is, that some of the fruit damps off through the exuberance of the foliage.

I may mention that soot is a fine manure for the Strawberry. When I forced this plant to the number of thousands yearly, I always put in the pot a handful of pure soot: this not only prevented worms from entering the hole at the bottom, but the roots were also nourished by it.

The pot cultivation of early Strawberries cannot well be done without, although this plan, with such an easy and simple plant to manage, is far from being the best.

I am one who think that a vinery or a peach house ought to be almost entirely by itself at the present time, as glass and hot-water pipes are so reasonable, and low pits being far the best for so dwarf-growing a plant; and so much more suitable, that this plant ought to have a place in the glass erections to itself. I tried this plan, the results of which any one can see if he turns to Loudon's Magazine for 1837. This plan was by taking up from the open ground bedded-out plants, with balls of earth entire, and planting them into pits that had been filled with hot dung and mould.

This plan I have practised for years. And since I have been here, I have taken into Covent Garden many hundred ounces. The greatest was seven hundred in one morning.

The red spider is almost unknown in a pit; while in a house it can hardly be kept under. The philosophy of forcing, I shall leave Dr. Lindley to explain as follows: the truisms he furnishes every grower ought carefully to study:

"Those who would understand the philosophy of Strawberry forcing should begin at the beginning, and first determine what it is they have to deal with. This can only be ascertained by examining the young flower-buds as they exist in the plant when it makes its first move towards growth. At that time they are collections of tiny scales placed over a small spongy centre. By degrees they take on the forms of calyx, corolla, stamens, and pistil. They form successively in the order in which they are named, the calyx first, the pistil last. The calyx and corolla are the most simple, grow the quickest, and most easily bear to be hastened: stamens require more time for growth, the pistil most of all. When high temperature, night and day, with abundance of moisture, and as much light as February yields, are suddenly applied to the Strawberry, it is compelled to grow; the predetermined parts advance, and obedient to the influences which their nature cannot disregard, they, by degrees unfold; but how? The oldest parts, namely, the calyx and corolla, simple in structure, and already advanced in their formation, suffer no injury, but appear in their usual state, arraying the blossom in gay apparel of white and green. The next, however, the stamens, having less time to form, acquire perhaps their yellow colour, but are powerless for their allotted offices; while the pistil, the most complicated of all the parts, that which demands the longest period for its perfect formation, but which is the latest that the flower produces, and which is to become the fruit, is a mere tuft of abortions, incapable of quickening, and shrivelling into pitch-black threads as soon as it is fully in contact with the air."

## WATERING.

This appears to be done by many in the evening, after the plants are allowed to be thoroughly exhausted. This I cannot understand: why should we allow the plants almost to die, when it might be done in the morning after picking? Here, again, my bed-system answers well for watering in the hottest sun. In my case, I have seldom any need of watering, on account of the depth of mould and the heavy mulching: and if watering can be avoided, so much the better.

Ground that has been planted four or five years only, will stand dry weather best; for instance, my early border that has not been trenched or dug these ten years, requires more water. This is easily accounted for; viz. the more solid the under soil, the less influence has the heat of the sun to draw up moisture from below. A strong solid, unbroken, and undrained clay, plants growing on it are first to suffer in a dry season, because water cannot rise through it, nor yet descend through it. But first drain deep, then dig deep, once separate clay into flakes it can never unite again. Clay is only loam unexposed and unmixed by surface culture. Clay is solid gold to a farmer or gardener, only take a little trouble by gradually going down; this need not be done at once.

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## GATHERING.

THERE are many fruits besides the Strawberry condemned by gathering before they are ripe and fit for the table; but Strawberries, above all other fruits, are picked, but too often, just anyhow. An old lady, when my Black Prince first came out, took the trouble to send me some by post, and said, "If this is your Black Prince, the gardener tells me they were not worth growing." Those she sent would not have been ripe for a fortnight. This sort, as well as my Prince of Wales, will hang until they are quite sugary. Neither the one nor the other, nor any other sort ought to be gathered till there is a rich gloss or saccharine appearance on the skin of the fruit, with a rich perfume. That will be several days after Strawberries are generally picked, and it is astonishing how long a Strawberry will keep if gathered in early morn; but if gathered in the afternoon, when the leaves and the fruit have perspired, and the whole plant is exhausted, in less than twenty-four hours they grow mouldy.

To judge a new Strawberry is very difficult. There are but few palates alike. In my case, so close upon London, only three miles south of the Thames, and on the high road to the Crystal Palace, anyone can call and taste the fruit, as well as see the habits of the plants, the treatment, soil, and everything.

My Prince of Wales has given great satisfaction to Dr. Lindley, he having grown it for several years, his gardener told me, when I called, that my sorts up to the present time surpassed all others for being very early and very late. The kind just named is not only early but the latest, on account of the numerous trusses continually coming up.

I have had a row of Elton for three years, side by side: the Elton is done three weeks before the Prince of Wales; besides, with the exception of the Black Prince, it is the finest preserver, and it is preferred by many on account of its preserving whole, retaining its bright scarlet colour. This Strawberry might be made much later, by planting it in cold northern aspects.

The following letter of Mr. Hillhouse speaks of the crop off a very small bit of ground, of this sort of Strawberry, the Prince of Wales, gathered from three o'clock in the morning, and sent off by eight o'clock, viz. one hundred pound-baskets, gathered by two gatherers only, myself making them up.

"Sir,

I have pleasure in stating that the Strawberries you supplied for our late anniversary at Wanstead, were, in every respect, very satisfactory.

I am, Sir, yours, &c.,

CHARLES HILLHOUSE."

My Princess Royal of England, as well as the Black Prince, if kept in the pots after forcing, and starved for a few weeks and then planted out, ball entire, will bear a fair crop of fruit in the autumn, as well as a first-rate crop the next year. They were treated as above at Mr. Scorer's, of Champion Hill, Camberwell, and they produced very good fruit, but what with sparrows and slugs, they suffered much, but a little attention is necessary. All Strawberries will fruit, more or less, treated as above; but as we cannot rise so late a sort as is required, it is just possible that this one might be a sure autumn bearer. Mr. Scorer's gardener took a prize with a dish of them, amongst other things, at a fruit show, on the 20th September, 1859.

I have avoided a general list of sorts. A grower, even if he had half that is put into those long lists, would neither be just to himself nor the public, to give an opinion, as so much depends upon culture, climate, locality, and soil, that those mushroom upstarts ought to try and refrain from giving their opinions. They surely do not possess the palates of everybody; neither do they know, neither can they know, the various ways of cultivation. Let it be understood, that I am not referring to the Pomological or Horticultural Societies.

I have had, at least, thirty years' practice, and I confess that I am but a learner still; neither shall I ever give my opinion, either in praising or condemning, right and left, as I see some do. The public are my judges, and they are the best.

Mr. A. Henderson, Pine Apple Place, writes: "I received the two sorts of Strawberries in good condition. The Improved Black Prince, or Richard the Second, is particularly fine, being twice the size of the old sort; fruit large, round and heavy, of an excellent colour, with brisk high flavour. Highland Mary is more tapering, after the shape of the British Queen, but fruit more regular, and of a more beautiful shape, of a good size, with a very sweet and rich flavour. The Improved Black Prince will be most valuable for preserving, the flavour being so brisk and sharp."

Mr. Henderson's judgment has proved to be quite correct—Richard the Second is my greatest favourite.

All I can state is that they are both quite distinct from each other, as well as their parents. They stand forcing well. They have been some years under severe test.

* * *

## NEWTON SEEDLING.

THIS is one raised by a Clergyman, and he made me a present of one hundred plants. The plants are very distinct, very dwarf foliage, red in stalk and runner, like its parent Black Prince. The fruit that the reverend gentleman brought me were large, well-shaped, and very fine, with good flavour. This one has proved to be prolific, and a most handsome, large, late fruit.

I have no artificial drainage besides deep trenching, and the first inventors of drainage, the worms.

The following letter was published, twelve years ago, by a good Strawberry grower, and contains first-rate advice up to the present day, and Mr. James Bennett, the writer of it, now lives in a place near here, where he has produced the same result as he did then. He is one who knows that a Strawberry Plant is perfectly hardy and a native of this country. Therefore, to be successful, he must treat it in a forcing-house, gently, and bring it on gradually, which Dr. Lindley has so finely and scientifically said in this pamphlet.

Having now, though very briefly, shown what is necessary to be done in Strawberry cultivation, and also how to do it, I leave these remarks for the public to determine their value.

# CUTHILL'S BLACK PRINCE STRAWBERRY.

CUTHILL'S Black Prince Strawberry is one of the best and earliest for forcing in cultivation. There are many gardeners who condemn this variety on account of not being able to set the fruit; but if well managed and treated properly no other can surpass it in quality and quantity. A few remarks may be of service respecting the treatment in setting and swelling the fruit. In watering Strawberries the greatest care should be taken, as it is one of the chief points in setting the fruit. When I observe the trusses or bloom spike two or three inches above the level of the pot, I place flower saucers under them, for it is very rarely indeed that I water them over the top of the pot. I fill the saucers with water, that is to say, those that require it, and look over them every morning, which is the proper time for watering. If I find any water left in the saucers from the previous watering, I throw it away; and if there be any of the saucers apparently dry those I fill up. If the plants and roots are in a healthy state, there will be very few but what require watering after a sunny day. The largest size pots I use for Strawberry growing are six inches, but most of them are smaller, and I place a single plant in each pot. When Strawberries are in full blossom, many dispense with syringing, fancying the force of the water from the syringe knocks the blossom off too soon, and prevents the fruits from setting, but this is an error, and, in fact, contrary to the operations of nature. If you close your houses early of a sunny afternoon, and use the syringe freely, and continue the treatment in fine weather, till the fruit begins to colour, then you may dispense with the syringe. By the same treatment you will not fail in securing a bountiful supply of fruit, as I think is proved by the following statement:—I began to gather for dessert from Cuthill's Black Prince Strawberry, on the 20th of March, and by the 25th of April I had gathered the enormous quantity of 150 dozen from 40 pots only. If I had counted the smallest, I can, with confidence, say the amount would have been 200 dozen.

The great secret in my cultivation is trenching deep after a few years. That, again brings up ground for active use that had been resting and gathering strength. My system of annual mulching in spring, has proved a most superior plan. My bed system, a square yard will contain from thirty to forty plants, surely that number must bear many more fruit than plants so far apart; besides, a large plant produces a few large fruit, the remainder being very small. not so with the one year alternate system of beds. Again, when plants plant themselves, see how much superior they are than man can do it, even upon the box-edging system, which is as close upon nature as we can plant them; above all ways, never employ the dibber for large fine-rooted plants. But for pricking out very young plants with roots hardly formed, or not more than half an inch long, the dibber may be used to advantage. But when I am obliged to leave my beds for two or more years, they never do so well as the one-year-old beds do, and upon the rotation system, that is, half the ground fallow, the other half in crop; exactly what I recommended to the Rev. Mr. Smith, of Lois Weedon, some eighteen years ago.

There is one thing I ought to mention; after mulching and the bloom trusses show, the beds ought to be gone over, and every one not showing bloom to be pulled out. This is a great benefit to the bearing plants afterwards.

The great secret with pot plants is to get them strong and well rooted before winter. Where only a small number are grown, the following is undoubtedly the best plan of proceeding. Take pots eight inches deep, or less, place an oyster shell in the bottom of each, and on this put a good handful of soot; then fill up the pots with a compost, consisting of half strong loam and half light rich mould. The mixture of mould ought to be moderately dry, for if wet mould be put into the pots, it is very often the cause why plants do not thrive; and more particularly when in bloom they often go blind, but if the mould be dry, when put into the pots, it does not swell to any injurious extent. Carry the pots to the Strawberry runners, and place one in the centre of each pot, and have a basket of small stones at hand, so that one may be ready to lay upon each runner, just behind the plant, in order to keep it steady, until it has taken root. I did not follow this plan myself, because I had such a large number (4000) of pots. I prepare them as before, and plunge them all to the brim in a piece of vacant ground; then, on the first dull day, I cut off the runners, merely removing the strings, and by no means cutting the roots or the tops, for both are injurious to the young plants.

I never allowed a drop of water from November, and from being kept quite dry nearly all the large leaves die off. During this time they may be kept under glass in pits, or stacked up on their sides against a wall out of doors. I always plunge the pots to the brim in the pits, for the plants do much better there than standing on the surface of the mould, and the pots ought never to be less than a foot from the glass.

* * *

### *Extracts from Letters concerning myself.*

"I am now able to state that Cuthill's Black Prince is different to Malcolm's Seedling, which by many in Scotland were thought to be the same. I have twenty-one sorts here, but the finest crops were from Black Prince, Princess Royal, and Princess of Wales."

*J. Thomson, Durris House, Aberdeenshire.*

Winchester. To a lady whose gardener would insist upon cutting off the foliage of Strawberries. "I have not cut off a leaf these thirty years, my reason is fully explained in the pamphlet I sent you."

To Mr. Davis, Ireland. Dr. Lindley published the American story first, just to see what we Britishers would say about Staminates or Pistilates Strawberries. No man knew better than Dr. Lindley that all Strawberries are Hermaphrodites, with the exception of some of the Alpines, which have nothing to do with the garden varieties of the present pay. See how well Dr. Lindley has described the progress of a Strawberry blossom in a former part of this pamphlet.

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PRINTED BY J. E. ADLARD, BARTHOLOMEW CLOSE, E.C.

# A TREATISE

ON

# THE VINE DISEASE;

WITH SUGGESTIONS, FOUNDED

ON NATURAL LAWS,

UPON A BETTER

SYSTEM OF CULTIVATING THE VINE,

WITH A VIEW TO THE PREVENTION OR MITIGATION

OF THE

MILDEW OR DISEASE.

BY

JAMES CUTHILL, F.R.H.S.,

AUTHOR OF "A PRIZE ESSAY ON THE POTATO;" "MARKET GARDENING;"
"THE CUCUMBER AND MELON;" "THE CULTIVATION OF THE
MUSHROOM;" "A TREATISE ON THE STRAWBERRY."

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Dedicated to

HIS MAJESTY THE KING OF PORTUGAL.

SIRE,

I humbly submit this Treatise on the Vineyards to your Majesty, with a sincere desire that your Majesty's Subjects may be benefited by the suggestions therein contained, in restoring the health of the Vine.

I am, SIRE,

Your Majesty's dutiful and humble Servant,

JAMES CUTHILL.

# A TREATISE ON THE VINE DISEASE.

THE cultivation of the vine is, when properly conducted, so easy and simple a matter, that it would not be requisite to say much about it, were it not for the mistaken views often entertained. Thus, in England it is frequently made a very complicated and expensive matter. The ground is dug out to a depth of four or five feet, in a border from fifteen to thirty feet wide, and the space filled in with a composition which would astonish the foreign vine-grower. In addition to the surface soil of an old pasture, grazed perhaps for fifty years by cows or sheep, a mass of manure is added, consisting of cow-dung, sheep's dung, horse-dung, night-soil, bullock's blood, boiled bones, hoof-parings from the smithy, &c.—a collection of ingredients as rich in their way and quite as indigestible as an English plum-pudding. When planted in such a mixture the vine grows at a terrible rate; the internodes become very long, the wood large, spongy, and soft; and when the plants come into bearing, the true Black Hamburgh is changed into a Red Hamburgh.

The foregoing practice prevails in the gardens of many of the wealthy of this country. Contrast it with that of a market gardener, who gets his living by grapes, Mr. Chapman of Vauxhall. He has houses of every description and in every position, all, however, very low and flat-roofed. Neither he nor his father ever made up a border, but merely planted their vines in a barrowful of rich mould, to start them. The natural soil of his ground is very light and sandy, and the roots travel where they like. But great care is devoted to *the pruning*. He prunes very early; this year several houses are pruned by the middle of October, and he summer prunes, regularly, never allowing any waste of the strength of the plants. He prunes on the spur system, stops the shoots one eye above the fruit; finer crops and blacker fruit cannot anywhere be seen.

On the Rhine, in Hungary, Switzerland, and other countries, the population carefully save up the whole of their sewerage and other manures, to feed their vine plantations.

The vine will not thrive in a strong retentive clay; where the soil is of this character a lighter mould must be put into the borders.

Vines should always be propagated from the eyes; by this plan they make firmer and more fibrous roots, and the wood is shorter-jointed, closer, and more solid, giving greater security for the quality of the crops. Grafting, or more properly, budding, is a very easy process. Cuttings of the sort or sorts which are to be put in, should be kept from the autumn pruning, with their ends in damp mould (bundles of such cuttings may be tied up and stuck into a compost heap, and left there through the winter). When the time arrives for budding, just before the sap begins to rise, in spring, a cutting with a strong eye should be taken, cut across about two inches above and below the eye, and split down the middle with a sharp knife. The stock is then carefully to be measured with the scion, and a piece cut out so as to fit the barks together neatly. The scion must then be bandaged tightly, and moss or some other substance retentive of moisture fastened round, leaving the eye itself uncovered. When there is a chance of neglect in regard to the keeping up of moisture, a piece of flannel listing may be rolled round with a long loose end dipping in a pan of water set upon a flue; the list draws up the water like the wick of a lamp.

Pruning of hot-house vines should always be done as soon as the wood is ripe, except in cases where late crops are required for winter dessert.

The vine-disease, as regards the vines grown under glass in England, is brought on in a great measure by mismanagement. In houses set apart for grapes alone, we have full control, but in a green-house, where all kinds of plants are grown, where air is given below and above, causing cold damp currents, and a continual watering of pot plants is going on, it is more difficult to guard against it.

But I must bear in mind that my object is not to write a treatise on the vine for this country. Some of the most eminent wine merchants in London have requested me to furnish some suggestions tending to the improvement of the cultivation of the vine in Spain and Portugal, with the view of preventing the disease.

In the first place, it must be observed that the vine was not intended by nature for an open-field plant, to grow exposed to the direct rays of the sun without the protection of any other plant. The tendrils are barren flower-branches, changed into organs by which the vine may cling to and support itself among the branches of some tall tree, the foliage of which must necessarily afford it some protection and shade. Travellers tell us how luxuriantly the vine grows, and festoons itself over the trees in its native countries, the hill-sides in the Caucasus; and even in cultivation, among the elms by the way-side in many parts of Italy, bearing great crops there; and where they have been known since the days of Virgil.

> "The next precaution of his rural cares  
> A range of reeds and forked props, prepares;  
> On these the vines their clasping progress form,  
> And brave the rigours of each rising storm,  
> Ascend the hospitable *Elm*, and spread  
> Their swelling clusters o'er its verdant head."

We find in England, that if some sort of shade is not used for the grape-house, for melons, cucumbers, &c., that a sudden burst of hot sunshine after dull weather produces mildew. Shading gives the overgorged leaves time to evaporate the sap gently, to elaborate it so that the breathing-pores are not injured or disorganized by sudden violent transpiration.

In my pamphlet on the Potato disease, I enforced attention to this same phenomenon, which attracted my attention many years ago.

In that case the remedial measures then and now followed, were directed to another point, namely, to the proper care of the tubers during winter; to the hardening of their system, so as to render them better able to withstand our changeable climate during the summer. Potato growers say the potato disease is now wearing out; they do not give me any credit for making them pay more attention to their seed-potatoes —but that is the grand secret of the "wearing out." Reflecting on this point, it has occurred to me that there is one part of the cultivation of the vine which requires most serious consideration, namely, the pruning or cutting of the roots.

In the vineyards of Spain and Portugal, the vines are planted four feet apart each way. This distance seems sufficient for their height, which is only three feet or thereabouts. But I find that the roots are allowed to travel where they like, and to become extensive enough to absorb much more than *three* stems only three feet high can require—in fact, to take up into the system much more than the plant can elaborate. The consequence of this will naturally be, that when a country is subjected to the kind of weather we have had all over Europe in these last few years, the vines will be full of water, the sun will disorganize the sap, and mildew will follow. Better management, then, is one of the requisites, not for the cure, but for what is better, the *prevention* of the disease.

Some may object to my view, the case of the great vine at Hampton Court, the roots of which grow down the main sewer from the Palace for several hundred yards. That the roots are very extensive is true enough, but look at the top also. This plant annually bears several thousand bunches of grapes; and this monster-plant lives more upon the gases of the sewer than upon the soil. It is a law of vegetable growth, that the roots will extend horizontally as far as the stem grows out above. Were it not for this grand provision, plants must die for want of food. If the great Hampton Court vine, however, were not properly managed, and allowed to produce great crops from the quantity of rich food it takes up, the top would doubtless soon fall into a diseased state. If I mistake not, too, the roots of this very vine have been cut a good deal on account of their obstructing the drains.

All fruit-bearing plants ought to have their roots pruned at times. Mr. Rivers and many others have clearly proved this. I have seen pear trees covering a large extent of a fine wall, and only bearing about a dozen pears at the ends until their roots were pruned.

The advantage of root pruning, like many other things, was accidentally discovered, many years ago, by the gardeners of this country, through lifting large fruit trees, and cutting-in their roots. It was found that they always bore more and better fruit after this operation.

I once planted two large vines in a new hot-house at Fulham; the plants, taken out of a conservatory, were upwards of ten years old. The roots were pruned, and in the second year after planting they bore excellent crops. This was more than twenty years since, and the vines are now every year bearing splendid crops of grapes. It would be useless to multiply examples: we gardeners, living in such a changeable climate, are compelled to experiment continually upon all sorts of fruits, flowers, and other vegetable productions.

In England, when we find a house of grapes going wrong, we first look to the roots. If we find, on taking off the mould, that the roots have got too low down among the subsoil, we bring up as many as we can of the fibrous roots, and cut off the larger ones, leaving them, according to circumstances, from five to ten feet long. Fresh mould is then placed under them, and every root brought to within a foot of the surface. I here speak in reference to old vines.

The roots of the vine in the wine countries will derive much benefit from pruning; the plants would be better nourished, since the roots would be much more fibrous, while the whole would be better under control. The present plan allows the roots to choke or eat one another up.

If root pruning can be practised so easily in our country, and with such benefit, surely it can and ought to be in another. The cultivators of the vine-growing districts must alter their system. The word *impossible* must not be listened to. All the world wants their wines.

In the next place, early pruning of the vine in autumn must be enforced. If the plants are pruned early in November, the grapes will be ripe a fortnight or three weeks earlier the next summer. Any one will be convinced of this who looks at the well-swollen eyes of those vines whose shoots are left on through the winter. Cutting them off after they have accumulated and deposited so much of the elaborated food, is a total waste of what nature would otherwise concentrate in the stems destined to bear the next crop.

I see by the accounts from Spain, that they are only now getting in their crops (Oct. 20th). We have plenty of grapes ripe upon our walls at this time in England.

Some twenty years ago, I followed in two places where I lived, the plan of pruning early; never later than the 9th of November. In each of the gardens the soil was very light and sandy. Finer crops of Black Hamburghs, Black Princes, and Sweet Waters, could hardly have been seen under glass. When the pruning time arrived, all the fruit still remaining on the tree was cut off, part of the branch with each bunch, and the grapes were hung up in the fruit-room; but I never went beyond the above time in pruning, knowing well that the finely elaborated sap in the wood would ascend still higher in the branches, and at a later period be cut down and thrown away. A want of knowledge of the laws of nature often causes us to bring on disease, and then we throw the blame upon everything but ourselves.

There is another very important point in the management of the vine, to which even in England we do not attend as we ought, that is, peeling off the old rotten bark, which, after it once gets loose, is simply a breeding place for insects. This ought to be done directly after pruning, and the stems to be painted over with a mixture of sulphur, lime, and soot, stirred-up in water to the consistency of white-wash, put on hot if possible. I am not prepared to say how the peeling of the vine would answer in warmer climates, but there appears no objection to it. If it is not done, the wash should be made thinner. The application of this would perhaps be a question of expense, and a cheaper substitute might be found.

When a dressing of this sort is applied for the first time to a vine or other fruit-tree, it is quite surprising to observe the renewed vigour and the dark green healthy appearance of the foliage in the next summer's growth. This is certainly in great part attributable to the total destruction of the larvæ and eggs of the insects peculiar to the plant, for no plant can thrive when vermin are allowed to breed at pleasure.

There is another cheap and expeditious plan, which might be adopted where things are done upon so large a scale as in vineyards. After pruning, and just before the ground is dug or forked, a portion of straw should be laid under and round each vine, and set fire to. This must be done on a calm day, when the flames will ascend straight. The straw should be about half-a-pound for a vine three feet high; it blazes up all at once fiercely and leaves hot ashes behind, effectually destroying the eggs of insects. Hot water, however, I have found the cheapest and most effectual remedy for insect plagues, and I use it in every case now, at a temperature of 130° to 150°, according to circumstances. Probably in my earlier experiments with the composition above described, the *heat* was the most important agent. These last two years I have destroyed all woodlice in my melon and cucumber pits. All insects have their hiding places; boiling water finds them out. It can be used with perfect safety upon wall trees, or standard trees, in mushroom houses, &c. Boiling water is not only the cheapest but the most effectual destroyer of insects and their eggs. An iron barrow engine could easily be constructed, with a fireplace under it to heat the water at pleasure. Also the burning of straw round trees in orchards destroys moss and insects effectually.

Man is the servant of Nature, and it is our duty to apply our knowledge and skill in her service. If we do not, we shall assuredly suffer for our neglect. I may relate one extraordinary instance of what a plant is capable, affording a case in point. I was once engaged at a large commercial grape and pine-growing establishment of Ipswich, supplying Covent Garden Market. When I went down in April, the pines were the first things to which I applied myself. There were four houses full of plants which my employer told me to throw away at once. He said they were seven years old, and in no season had they given sign of fruiting. No wonder! Millions of scale insects were thickly deposited all over the plants. I cut every plant over by the surface of the pot; then prepared a strong steep of sulphur, nux vomica, snuff, soft soap, camphor and spirit, all boiled together. When this had cooled down to about 100° I dipped every plant into it, potted them again and plunged them in bottom heat in close pits. The whole of them recovered and started into fruit. When ripe they were sent up to Mr. Pullen in Covent Garden Market, and he returned me 8s. per lb. for them, for the Lord Mayor's dinner on the 9th of November. I mention this to show what nature will do when properly assisted.

The diseases of plants will be prevented only when we acquire a more general knowledge of the laws of Nature. Botany and Chemistry ought at once to be added to our early education. Without instruction in science we can never arrive at a proper appreciation of the works of the Almighty.

As an illustration of the ignorance of those now engaged in the production of wines, I shall give the answers furnished to a series of questions, by a Spanish gentleman, who cultivates some 300 acres of the Sherry grape:

Q. What sort of soil is yours?

A. Black, red, and white.

Q. Do you dig deep?

A. About a foot.

Q. How do you propagate the vine, from eyes or cuttings?

A. From cuttings only.

Q. What sort of manure do you use, and how often?

A. None except when the vines are planted.

Q. Are the vines ever dressed with any chemical mixture in the winter or early spring?

A. Never.

Q. Have you noticed that the disease attacks the vines upon hilly as well as upon low grounds?

A. I observed no difference.

Q. What time of year do you prune?

A. December; sometimes in November.

Q. What height are your vines?

A. About three feet.

Q. How many stems upon each plant?

A. Three.

Q. How far apart are they planted?

A. About four feet each way.

Q. Are the roots ever pruned?

A. Never.

Q. Do you think the soil is exhausted by a long continuance of one crop?

A. Never if well cultivated.

Q. How can the ground be well cultivated if you only manure it when first planted?

A. That is the Spanish way of doing it.

In England we should call this downright starvation. I have not inserted this gentleman's information merely to raise a smile. We have in this country at the present time many great landed proprietors quite as ignorant of what they ought to understand thoroughly, as this Spanish gentleman.

I shall take the liberty, however, although this may not perhaps meet with the approval of the Spanish and Portuguese press, to recommend the large growers of the vine countries to provide thorough-bred Scotch and English gardeners for managers of their vineyards. My reason for this is, that I am always told that the Spanish and Portuguese managers and labourers will not go out of the old track which their fathers pursued. This will not do now-a-days. The increase of population, and the exhaustion of soils by long cropping, demand a thorough change from the old worn-out systems of cultivation.—Could I have lived here upon one acre of ground, at an annual rental of £35 for the last sixteen years, unless I had adopted a proper and generous cultivation? Digging only a foot deep into the crust of the earth, will no longer answer; but we know that a mass of unavailable food lies locked-up beneath, which we can turn to account if we only apply ourselves properly to the task. Our forefathers might be content merely to stir the surface of the soil, but we come after them, and our requirements are greater, not to be provided for by so shallow and lazy a mode of cultivation.

By a proper treatment of the soil, and skilful management of the vines, two pounds of grapes would be produced where one pound was produced before, and this without the least deterioration of the quality of the fruit; on the contrary, it would be far superior. By the long-continued cropping on the shallow system, the land must be greatly impoverished; and I do not hesitate to tell the wine-growers, that their land is starved of everything but that which God gives them for nothing—water; and too much of this, without proper proportions of other ingredients, will bring on disease.

On a light sandy soil, a suitable manure should be put on at least once in three years. If manures are altogether withheld, the soil must become exhausted of its organic constituents, and therefore it should be fed by proper applications of such manures as bones, night-soil, dung, charred peat, prunings of the vines, &c., and the ashes of the prunings, wood-ashes, and salt, would be very beneficial. When I grew early potatoes for Covent Garden Market during the years of the disease, I used no manure except salt and soot (the former at the rate of two tons per acre, the latter at thirty bushels per acre), knowing that these materials would tend to strengthen the stem, making it more woody and less spongy, and consequently less liable to disease. I am well aware, that to use strong manures in the vineyards would create greater luxuriance and exuberance of shoots and foliage, and would diminish the saccharine matter and flavour of the wine. In England we are not free from blame on this head, for while thirty years ago our fruits were much under the proper size, we now often sacrifice flavour for magnitude, producing a large watery fruit, far inferior to a smaller one in which the same amount of flavour is condensed. But if we withhold manure altogether from the soil, the plant will use up all the organic matter; and if the soil is not properly tilled, it will be exhausted of soluble mineral salts; and then have nothing to live upon but water.

It has been noticed that vineyards upon high ground do not take the disease so readily as those in the lowlands. Perhaps this may be accounted for by the soil being naturally better drained in the former, while from the freer circulation of air around them the plants retain less water in their system, and grow less luxuriantly; under these circumstances they will be less liable to be affected by a sudden change of weather and hot sunshine.

The lowlands necessarily cannot be so well drained; they will have more water than is required, and there will not be so free a circulation of air among the plants. This will cause a great luxuriance of growth, and the plants will be more fully saturated with water; when a sudden burst of bright sunny weather comes, the sap is disorganized and mildew soon follows. It would appear from this that the vineyards of level lands require a different treatment from those on the hill-sides or rising grounds. The roots of the vines must be kept shorter, all rank manures withheld, and it would be far more important here to provide some shade for them.

I hear that the Spanish and Portuguese growers will not hear of any other plant being mixed with their vines, or, in my simplicity, I was going to recommend the growing of an intermediate plant, for shade, such as Jerusalem Artichoke, Indian Corn, or any other plant of easy cultivation which would grow four or five feet high and pay for its trouble; the best mode of paying, however, would be the prevention of mildew.

It is useless to recommend temporary covering, such as straw, as it would be impracticable to adopt this in large vineyards. Whether or not any intermediate plant is grown, I must still enforce the importance of root-pruning, and the other operations mentioned in this pamphlet. Some say, in Spain and Portugal, that the disease will wear itself out. We know that it will, provided we get a succession of fine summers. But if we do not, the vines will wear out and die, as the currant vines have in Madeira. If the proprietors of vineyards do not insist upon a proper management, they will have to lament the total loss of their plantations, and will be forced to crop their land with what, if applied in due time, might have saved their vines, namely, an intermediate crop. I have the greatest faith in the efficacy of this, not only as a means of affording a cool shade to the vines, but as a means of using up the superfluous moisture of the soil. Moreover, the intermediate plant might even serve to enrich the soil in organic substances, for we know that the use of green crops is very beneficial in this respect on our own corn lands. A leafy crop which absorbs much ammonia and carbonic acid from the atmosphere, would be valuable if grown merely for conversion into manure, as it in this way would restore to the soil all it had taken away from it, and the food derived from the air in addition.

Long cultivating one sort of plant upon any soil, but more especially a vine soil, which ought to be light and open, will use up all the proper nourishment or salts of the earth which are most useful for the vine, leaving the soil rich in salts most proper for an intermediate crop, an overabundance of which may be injurious to the vine.

I am told it is the custom to dig in all the fallen leaves in the course of the winter. This is quite right, if the vines are perfectly clean; but if they are infested with vermin or mildew, the leaves and shoots should be carefully collected and burned, and their ashes strewn over the ground.

All the above remedies should be tried, especially with the *early pruning*. *Winter and spring* pruning must be abandoned for ever. Why follow any longer an old-fashioned plan which renders the vines more liable to disease, and throws the crops back a fortnight in the autumn ripening? I have been told, it is true, that the good people of Spain will not gather their grapes even if all ripe, before a certain day. Away with such nonsensical trifling.

I see in the 'Gardeners' Chronicle' that the growers round Naples have followed the plan which I published in the London papers, that of keeping the vines near the ground, with much better results than any other.

I have lately been to see another case of flat training, at Mr. Baker's, near the Old Kent Road. He has two vines trained upon a flat trellis, projecting about eight feet from the cottage, this canopy being about seven feet high. One vine had seventy, the other one hundred-and-fifty bunches, all nearly ripe, and those Black Hamburgh. A sewer passes beneath where they feed from; his vines are always pruned at the fall of the leaf in November. Mr. Baker is very careful never to allow any superfluous shoots during the summer's growth. He has never had the disease.

Another case is offered near my own home, at Mr. Yarnton's, on Denmark Hill. The roof of the vinery is very flat, with no ventilation in front. No sulphur has ever been applied, and no mildew has ever come upon the vines, which bear excellent crops.

The whole of Mr. Chapman's houses are so low that a man cannot walk along them with his hat on. Mr. C. uses sulphur as a preventive, but he has never had the least sign of mildew. His houses are no doubt often covered with soot and dust, and the flat-roofed houses do not receive the direct rays of the sun, therefore do not want so much air; front ventilation is seldom wanted, and cold currents of air are avoided. The success in these cases appear to bear out my argument in favour of vines being trained in a horizontal position, so that the leaves may escape the direct rays of the sun, and thus be less liable to mildew, in changeable weather, when the vine is in full growth in the vineyard.

This brings me to the close of my recommendations as to the improved method of cultivating the vine in foreign countries. Should any of my humble suggestions be productive of good result, and help to mitigate this disastrous disease, I shall be but too glad.

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# A TREATISE

ON

# THE CULTIVATION

OF

# THE MUSHROOM.

BY

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*'The Cucumber and Melon,' 'The Vine,'*
*'The Strawberry.'*

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# MUSHROOM GROWING.

In the cultivation of this most delicious and nutritious esculent there are very many points that require to be understood. The whole process should be so simplified that the young gardener or amateur might easily understand it by paying attention to the rules which I shall endeavour to lay down for their guidance in the following pages. In my pamphlet on 'Market Gardening,' I have pointed out the mode of making up out-of-door mushroom beds in the form of ridges; but, as this plan differs very much from that which I practise, and which it is really necessary should be known by the inexperienced, some further instructions are requisite.

The mushroom is generally grown in dark houses, made on purpose, with shelves, having side boards from nine inches to a foot deep, one shelf being placed above another, about two feet apart, with a gangway down the middle. Such houses are generally built against the wall of a vinery or other house which faces the south. The mushroom house, in this case, faces the north, and is generally enclosed all round by a wall. Mr. Oldacre first introduced such houses into this country when he came back to England, after having been gardener to the Emperor of Russia for several years. The first house of the sort I ever saw was at Sir Joseph Banks', where Mr. Oldacre was then gardener, and at the present day it is the best and safest house for severe weather—such houses having a flue passing through them; but very often this dry heat does more harm than good, especially if the house happens to get overheated. A hot water pipe is the best, and is now generally used: it should only be adopted in severe weather. While I lived in private families, and they consisted of all grades, from royalty downwards, I was never so lucky as to have an Oldacre mushroom house. The next best kind of house is perhaps a vinery. I have two old houses forty-five feet long, each with a pathway along the centre, and beds on each side four feet wide, and about one foot four inches deep; these are made up of dung and mould. I have also another span-roofed house, with beds on each side, in which is the same depth of manure. In this low span-roofed house I am enabled to keep the beds much longer in bearing during summer by putting a covering of straw on the top, which, during hot weather, is watered every night. This is done to keep the inside cool. While under this treatment the maggot cannot breed in the mushroom. Since I discovered this plan, I have had them at five shillings a pound weight in July. Brick pits are excellent places for beds, on account of the facility with which they may be covered, namely, with glass, straw, and mats during cold weather, and they can be kept very cold, during the early spring, by watering as above directed.

A cucumber frame also makes a good bed; in fact, a bed may be made anywhere, provided everything is managed as I shall endeavour presently to explain. Even railway arches near towns would make capital places both for winter and summer mushrooms. Sheds are second only to pits or frames; the beds in them are convenient to get at, and are easily covered and uncovered. I have long grown mushrooms under open sheds, but under great difficulties, on account of the ravages of the wood-lice. Wood-lice get as fat as porkers, in no time, upon them. An easy mode of destroying them will be presently described. Beds in sheds are generally made to slope from the wall—say three feet high—next to the wall, and sloping down to the ground. A great improvement is a foot plank fixed on the floor in front to keep the dung and mould firm, while it keeps your bed more flat, and is more suitable for receiving the water, &c. A flat bed is more natural than the ridge system. I have all my beds higher in the centre six or eight inches. This plan gives more surface of bed, and when boiling water is used to kill the wood-lice, it runs into the crevice between the wall and bed, where those insects hide. Orchard houses would make fine places for mushroom beds. Some of my readers may recollect that in the 'Gardeners' Chronicle,' some years ago, I wrote that kitchen gardens might be covered over with glass, and that vegetables might be grown in the open fields. I rather think, therefore, that I am the person who gave the first idea of an orchard house. Mushrooms can be grown anywhere, in stables, lofts, coach-houses, yards, large boxes, cellars, &c., &c., out of doors.

I must not forget to remind the cottager that it would be a shilling or two a week saved to him during the winter if he had a good little bed of mushrooms, even for his own family, to say nothing about a shilling or two that he might gain by selling to his neighbours. I can assure him, mushrooms grow faster than pigs! and the mushrooms do not eat anything; they only want a little attention. Addressing myself to the working classes, I advise them, in the first place, to employ their children or others collecting horse-droppings along the highway, and if mixed with a little road-sand, so much the better. They must be deposited in a heap during summer, and trodden firmly. They will heat a little, but the harder they are pressed, the less they will heat. Over-heating must be guarded against: if the watch or trial stick which is inserted into them gets too hot for the hand to bear, the heat is too great, and will destroy the spawn. In that case artificial spawn must be used when the bed is made up; but this expedient is to be avoided on account of the expense. The easiest way for a cottager to save his own spawn would be to do so when he destroys his old bed; he will find all round the edges or driest parts of the dung one mass of superior spawn; let him keep this carefully in a very dry place, and when he makes up his next bed it can then be mixed with his summer droppings, and will ensure a continuous and excellent crop. These little collections of horse-droppings and road sand, if kept dry in some shed hole, or corner under cover, will, in a short time, generate plenty of spawn, and will be ready to be spread on the surface of the bed in early autumn, say by the middle of September, or sooner. The droppings during the winter must be put into a heap, and allowed to heat gently, say up to eighty or ninety degrees: then they must be turned over twice daily to let off the heat and steam; if this is neglected, the natural spawn of the droppings is destroyed. The cottager should provide himself with a few barrowfuls of strawy dung to form the foundation of his bed, so that the depth, when all is finished, be not less than a foot. Let the temperature be up to milk heat; he will then, when quite sure that the bed will not overheat, put on his summer droppings. By this time these will be one mass of natural spawn, having a grey, mouldy, and thready appearance, and a smell like that of mushrooms. Let all be pressed very hard; then let mould unsifted be put on, to the thickness of four inches, and trodden down hard with the feet, and watered all over; and the back of a spade may now be used to make it still harder, as well as to plaster the surface all over.

With regard to the condition of the mould, if possible, a sandy loam, or a light, dark, rich mould should be used. Above all things it must be kept sweet by frequent turnings, and care must be taken that no chalk or lime is mixed with the mould, and that not one worm is in the bed at moulding time. Worms are great enemies to a mushroom bed, on account of their boring and loosening the soil, and perhaps eating the spawn also.

In planting out artificial spawn, merely insert it into the surface, just covering the top of the spawn over with droppings; and let it be one foot apart each way. If spawn is planted too deep, it never thrives; it delights to be near the surface.

In making up beds in September, never mind if the heat is nearly gone, because after the bed is finished a little heat can easily be produced by means of hay coverings. When the bed is finished I put on a slight covering of hay, merely to keep the surface from cracking: this covering must be removed now and then to dry, or it will get mouldy, and, in some instances, perhaps, over-heat and spoil the bed. Bear in mind that a mushroom rejoices in a September heat, and that the spawn, like a running underground root, requires time to ramify and strengthen itself. I never like to see the tops appearing sooner than two months after the bed is made, neither do I water until it comes into bearing, and it ought never to be watered at all until the sixth week after spawning. Too much heat and too much water are the greatest enemies to young spawn. Do you ever see a crop of mushrooms in a field after a wet summer? On the contrary, the finest crops are produced in a dry summer.

The quantity of water to apply is a very difficult matter to indicate. When I do water, I give the beds a good soaking, so that the moisture may sink down amongst the dung, and at intervals, perhaps three times in the course of the day. The water in winter should always have the chill taken off it. Generally I use liquid manure-water, and am not very particular about its strength. Mushrooms are fond of good things. I do not water oftener than once in three weeks or so. It is a great mistake to water often after the beds come into bearing: it destroys the spawn, and makes the mushrooms come up weak; and if the surface is wet and cold, they damp off as soon as they appear. The greatest enemy I have had to encounter, during my long experience, has been the wood-louse, slater, cheese-bug, or pea-bug, or whatever name it goes by—not only in the case of mushrooms, but also in that of melons, strawberries, cucumbers, &c. These pests eat up everything; they are not at all particular, being never troubled with indigestion. Arsenic put on bread and butter has no effect on them. Toads I had to eat them up; bantams I had; all helped to keep them down; but their propagation is so rapid that all my experiments failed until I thought of boiling water as a cure, and when I first tried it upon a numerous batch in a cucumber pit, they were dead in a moment. Boiling water will kill them at once, only it must be done with care, and in the following way. Uncover your mushroom bed and allow the wood-lice time to retire to the cracks and crevices between the bed and the wall; (all cracks in the bed ought to be filled with fine mould before the bed comes into bearing;) then have your boiling water ready, and, with a watering-pot, pour it down into the cracks between the bed and the wall, or wherever wood-lice are likely to hide. If this is repeated now and then these troublesome and most destructive vermin will no longer be much annoyance. Had I found this plan out when I first came here it would have been of the greatest value to me.

Cooking mushrooms is so simple and easy that the cottager's wife may not require any hint from me. I will, however, tell her my plan. If they be of a good size, skin them and place them in a dish, one on the top of the other, peppered and buttered; (no salt, as that draws out the juices:) then put on the cover, and place the dish in the oven for half an hour. Do not take off the cover until they come to table. In the case of buttons, or small ones, merely cut off the roots, and wash them in water; never mind peeling them, as the skin is very tender; put them into a saucepan with salt and butter, rub in flour and pepper, but put no water—merely let them stew for half an hour, but never boil. The cottager will find that mushroom catsup, if he has a large crop, will always sell well, and that artificially-grown mushrooms are by far the best for that purpose. Our London catsup is certainly very high-flavoured, but it is said that it is not unfrequently made of the broth of dead horses.

What is spawn, and how is it first formed?

This point is rather above my comprehension; and I merely advert to it to show what a tender subtile article we have to deal with; how easy it is destroyed for want of a little knowledge of its formation and character. In the first instance, the elements which produce it must be contained in the horse's stomach, where there is neither too much heat nor too much moisture to interfere with its formation. On the other hand, how easy will it be to produce enormous crops, if we have some knowledge of the material we have to deal with. It is very clear that dung near the surface of a bed, say four inches deep, ought never to be heated to more than blood heat; if it be allowed to heat much beyond that, you will most certainly destroy the spawn, or embryo mushroom. If the droppings are not heated at all, but dried in the sun during summer, as I do them, you are quite sure of getting numerous crops, provided the bed is not watered too soon, nor too much of it given at one time. The two greatest enemies of spawn are too much heat and too much water. A mushroom bed, shut out from sun and air, cannot evaporate moisture; even plants with leaves want but little water if shut up from bright light.

It is quite out of my province to tell the public how to make brick spawn; that is a trade I do not wish to interfere with; one thing I do protest against, namely, measuring spawn by the bushel. Did any one ever hear of a bushel of bricks? If I buy bricks of spawn for 4d. or 6d. each, I then know what I am about. A London brick is seven inches square, and two thick, like a small paving tile. Those who are fortunate enough to get Mill Track spawn will find it the best of all. This spawn requires no heating beyond summer heat to make it, and no other material than sandy mould and pure droppings; it is mixed and made by the horse's feet.

A gentleman, when he had learned from the 'Chronicle' that I was about to write a treatise on the cultivation of the mushroom, sent me the following questions to answer, saying that unless I explained my whole practice, he, for one, would break down half way, as it were, up the ladder.

Question. In what condition should the manure be?

Answer. I care not how the dung is for the under part of the bed, provided there are about six inches of droppings, and unheated dung for the surface, all quite dry; if fresh dung is trodden very hard it stops overheating, and retains the heat longer, saving all the ammonia and other salts.

Q. What should the thickness of the dung be?

A. All my beds are from one foot to one foot six inches deep.

Q. How do you let out the heat?

A. By making holes, six inches deep, and one foot apart, in regular rows; and when the heat is reduced to eighty degrees, these holes are filled to within three inches of the surface with droppings; then the spawn is inserted in each hole.

Q. What should be the exact temperature of a mushroom bed?

A. September heat, or about sixty to seventy degrees, on the bed's surface; this heat can always be maintained by hay and mats, or otherwise.

Q. How far will a bushel of spawn go?

A. About one hundred square feet.

Q. Should the bed be moulded at once?

A. Not when made up; but immediately when spawned.

Q. What is the right soil? Should it be dry or wet?

A. A soft, soapy, loamy, yellow, sandy soil is always best; but rich, light, dark, sandy soil does well. Never use clay, or chalky, or limey soil. It matters not much whether the soil is dry or wet, as it must be made wet to get it very solid when finished.

Q. What thickness ought the mould to be when put on to the bed?

A. Three inches if a loamy soil; and when this has been trodden down and beaten with the back of the spade, it will then be about two inches thick; if light, sandy mould, not less than four inches.

Q. When should a bed be first watered?

A. From six to eight weeks after formation; but that will depend upon the dryness of the dung when made up. Mind, as before said, to guard against too much heat and moisture. Soft water should be used, never pump water; in winter let the chill be taken off it.

Q. How much water should be given at a time, and how often?

A. Very difficult to say; but not less than a half gallon to a square yard: liquid manure water half and half.

Watering, I may add, depends much on the situation of the bed, as well as the state of the weather. I am aware that there are repetitions in this pamphlet; but I hope they will be excused, as I wish to make myself thoroughly understood. I may mention that one pound of well-grown bed mushrooms is worth three pounds of field ones, for any purpose whatever; and a bed made properly lasts three or four times longer in bearing than field mushrooms do. Mushrooms are second only to beef and mutton. The price of mushrooms during winter is very high; and until people grow them more plentifully, they *will be* high priced. So also are sea-kale and asparagus; and yet these three vegetables are all natives of Britain.

Mushroom-beds out of doors are generally made into ridges; that is done by shaking out the short material for the surface of the bed, and employing the long stuff for the interior, as well as for covering over the beds during winter. The ridges, when I used to make them, were trodden as hard as possible. This does not allow strong fermentation to take place; but it keeps up the heat much longer during winter, which is what out-of-door beds require. The foundation of the latter were generally from five to six feet wide, gradually rising, in the form of a ridge, to the height of three feet or more; they were spawned in the usual way. The moulding must be begun at the bottom, the mould being worked up on both sides, finishing at the top of the ridge.

I may be asked why I use artificial spawn at all in my beds? This is an old prejudice, which it is hard to get rid of; and I must own that in some places where I have lived I have had as fine beds as ever were seen, without artificial spawn; but in the event of any mistake in the making up of the bed, the artificial spawn improves the chance, making, as it were, doubly sure of a crop, as well as obtaining an earlier and longer one. For instance, my first bed now, November 10th, has been spawned six weeks; the mushrooms are showing above the ground, and exactly above where the spawn was put in below. Although I have taught the cottager how to save his own spawn, I am quite sure that I shall not trouble myself so long as I can buy first-rate spawn at from 4*d.* to 6*d.* per square, where poison toadstool spawn never enters into its composition.

I have thus endeavoured to lay bare the whole of this most important subject, and in as simple and explicit a way as I possibly could; and as this treatise is intended for amateurs and others who are uninformed in the art of mushroom-bed making, I trust that each and all will be rewarded for their perusal of it by fine crops of this most valuable winter esculent, which is only known now to the wealthy, who can employ first-rate skill in its production. I have also proved that even the wealthy need not to be deprived of this luxury for several months during summer, as they often now are; for it would be as easy to have an underground cold house for summer as a warm house for winter. The maggot will not breed in a mushroom with the house kept about sixty degrees; as a proof of this, I may mention that on July 12th, 1856, in my span-roofed house, where it was covered and syringed every night to keep down the heat, I had no maggot; this was during very hot weather. I had a little mountain of mushrooms which, when it first appeared, was not bigger than a sixpence, but when full grown its circumference was three feet six inches; and its weight four pounds and a half; and according to the market value at the time, it was worth at least twenty shillings. I have preserved a drawing of them. This year my finest mushroom was grown in the same house; it weighed eleven ounces, on the 28th of May. I merely mention this to show that it is not at all impossible to grow mushrooms free from maggots in hot weather as well as in winter.

The only simple test where doubts exist about the true edible mushroom is putting salt over the gills, which, if the mushroom be genuine, will turn black in a short time, being of exactly the colour of an old over-grown one. On poisonous fungi salt has no effect. No one need have the least doubt about mushrooms grown by themselves, and from pure horse manure and pure spawn; of course, no one would think of mixing horse-chestnut leaves nor old decayed wood with their beds. Poisonous mushrooms are only picked up by the town hawker, who hunts the fields, in which, from ignorance or carelessness, he is as likely to gather toadstools as mushrooms.

I may here mention a remarkable fact that the mushroom has the power of lifting a heavy weight. I was an eyewitness to this thirty years ago, at Roehampton, Putney Heath, near London. One morning, very early, all the gardeners were invited to come and see this wonder. A large mushroom had lifted up one end of the flagstone, at the entrance of a public-house door, to the height of three inches; the spawn in this case having been generated by stablemen scraping their feet at the door. I can easily understand the mushroom forcing up through loose earth, but its lifting a flagstone I cannot comprehend. Mushrooms are seldom found pushing their heads through solid earth. The spawn grows to the surface when properly matured, and as soon as it arrives into the air, it quickly forms into a head, or mushroom.

I am aware that mushrooms are found growing upon all kinds of grass-land, but it is generally very hard on its surface: and the spawn is never found more than about two inches deep—if a strong soil, not more than one. In gathering mushrooms, never cut them, only twist them gently off; if cut, the remaining stem soon rots, and injures the succeeding spawn rapidly rising from underneath to form young mushrooms.

November 23rd.—Uncovered my first bed, or No. 1, twenty feet long, by four wide, and there were thousands of woodlice. These insects soon retired to the crack between the bed and the wall; boiling water was used to kill them. The bed is now coming fast in bearing; it was watered at intervals with five gallons of water, for the first time. The reason why a bed ought to be watered at intervals is, to give time for the water to soak into the solid parts. If watered all at once, it runs into the loose parts or cracks, over-watering one part, leaving the other solid parts without any. The hay is put out to dry, or dry hay is again put on, after the water has penetrated. This bed has now been spawned eight weeks.

No. 2. Same house and size, spawned October 6th, uncovered, and all woodlice killed. Hay put out to dry; all cracks filled up with mould, having only the crevice between the wall and the bed for killing woodlice. Mushrooms just coming up; no water given.

No. 3. Also under glass, forty-five feet long, four wide; spawned October 28th; only uncovered to dry the musty hay, and kill the woodlice.

No. 4. Same size as last, and in same house. Just made up with fresh stable dung, trodden very hard, so that the fermentation never gets too high to dissipate the ammonia and other rich salts of the manure. The droppings for the above beds were all saved during summer and autumn, and I have still plenty left for others. One thing I have not mentioned, that if a person requires a bed to be in bearing very early, that can easily be done by spawning, while the heat is from ninety to one hundred degrees, and covering with half the quantity of mould. Mind, it will not be a lasting bed; in this case you can force them in four or five weeks.

Nos. 5, 6, 7, all in same way. The four beds mentioned are merely to show the process. Some seasons I begin earlier than others.

I have explained enough now, I trust, to make my readers thoroughly understand how easy it would be to largely increase the supply of mushrooms—they forming, as it were, the last and connecting link between the vegetable and the animal creation. The misunderstanding of its cultivation by the many, and the successful cultivation by the few, has long kept this most delicious and nutritious food as a dainty only for the wealthy.

Some persons have asserted that they have had various species upon the same bed. This I have never seen. It may be true that a gardener might make up his bed with a bad mixture of dung, and his mould from hedges and ditches, and full of spawn of other fungi. The true mushroom keeps itself as distinct above all others, (in fact, more so,) than any other vegetable known. I have been a mushroom-grower over thirty years, and never saw any but the true one growing upon all the beds I have ever made. The spawn-makers are very particular, and if with the material which the bed is made of, a spurious fungi cannot exist. Sudden changes from heat to cold and damp often turn the gills to a mealy colour and various shapes; but had those been gathered as buttons, or before opening, the change of colour and shape would not have been noticed. The mushroom, like other plants, is liable to various diseases of different forms that growers who are very particular are seldom troubled with. In the winter of 1860 I had them of all sizes—many eight and ten ounces, with the gills a beautiful, silky, pinky, salmon colour, with a delicious, fragrant smell.

An easy way of forcing mushrooms, asparagus, seakale, rhubarb, chicory, potatoes, by hot water, upon a large or small scale, is published in my 'Market Gardening.'

## APPENDIX.

Since writing the preceding pages, I have made one or two discoveries beyond those mentioned therein. They were not inserted in the second edition, because I was afraid some one would make a mistake. My old way was as follows:—After the bed was made up and the heat had subsided to about the temperature of milk, the bed was spawned, moulded, plastered down, and finished. This plan drove the remaining heat out of the bed. Without a little heat the spawn could not grow and run; and should the least mismanagement occur—such as too much water being given, or the bed being made up too moist, or with two little covering, &c.—the probability is that the crop would be spoiled.

My practice lately with about twenty beds (and more since the time when I first tried it) has been to spawn and finish the beds as soon as the heat began to be considerable—say 100 degrees or more. Before the bed gets to its greatest heat, everything must be ready. The spawn is inserted in the dung, merely covering it over. The mould is then put on and trodden down hard, watered, plastered, and finished. A stick is inserted to ascertain the heat. By the next morning, strange to say, the heat has gone nearly to the bottom, so that no injury to the spawn could take place. It was difficult to convince even myself of this new effect. But it is material. Placing three or four inches of cold mould on the surface of the beds, then treading it very hard, and watering and plastering it, all tends to drive the heat downwards.

The great advantages of this method are, that the ammonia and the strength of the manure are not wasted, and that the heat, which, as it were, is latent, can be brought up when wanted by covering the beds with hay or straw; consequently, the crop can be produced two weeks earlier than by the old plan. Great care is required not to force the crop sooner than in six weeks.

By adopting the above practice, and a continual rotation, I have not been without mushrooms for a day during the past three years.

There is a maggot which I think is destructive to the very young mushrooms, and hitherto I have not discovered any other way of killing it than by crushing it with the finger on the mould. When the mushrooms are no bigger than a pin's head, these maggots devour them, leaving their little shells gutted out. I long thought that this was caused by cold and damp. I have been of opinion that the maggots turned into earwigs. They are about half an inch long. For two thirds of their length from the head their colour is dark purple. They are very active in travelling, having three legs on each side of their bodies, situated near the head. They no doubt eat thousands of the tiny buttons just forming on the surface of the beds. A person looking carelessly over an uncovered bed would not notice them; they are so active that if there be the smallest hole or slit they are out of sight in a moment. The only mode of destroying them is to uncover about a yard of the bed at a time, and crush them with the finger. Boiling water cannot be employed to kill them, as it would destroy the crop. This insect is unlike the woodlice, for these run to either side, and then boiling water can be used to destroy them, without doing the least injury to the bed. My better-half tells me that it is ten times more destructive than the woodlice, on account of living upon the slender and newly-formed top just arrived at the surface of the bed. It is entirely different from what is called the mushroom maggot, which is thought to be of spontaneous growth, similar to cheese mites and the like. They may be produced at once in a temperature of above 70 or 80 degrees.

Upon this point I have taken particular notice for some years, and I have now discovered that mushrooms can be produced free from insects in summer as well as in winter, by keeping a low temperature upon the surface of the beds. This can only be done with water —not watering the mould, but sprinkling the mats and straw. The heat is extracted from the surface of the beds by such damp covering, and of course the maggot cannot breed. Take an illustration: If in hot weather you place a piece of butter on a slab, reverse a basin over it, and put a cloth steeped in water over the basin, it will make the butter hard, however hot the weather may be. In 1863, we had mushroom beds in glass houses fully exposed to the sun; the temperature in the shade was from 80 to 90 degrees, but we had fine crops, and quite free from maggots. If watering be neglected, failure must result; yet too much water must not be given or the bed will be drowned.

In my first edition I stated how the cottager may make his own spawn with horse manure only, but it takes much longer to breed than if the following plan, introduced some years ago, be adopted:—Any mushroom grower knows too well that horse droppings, properly attended to, will produce splendid spawn in the course of two or three months; and that this naturally made spawn succeeds, and continues to produce crops after the artificial spawn has produced an early crop in the beds. To make a small bed and to form the spawn quickly, lay a foundation of horse droppings, say a square yard, and the first layer four inches deep; have some artificial spawn ready crumbled into dust, of which scatter a handful over the first layer, and tread it down hard, then put on another layer of horse droppings, and then more spawn, and so on till the heap is about two feet high. Mark, all must be well trodden in order to prevent the heap from attaining to more than 80 degrees of heat. Cover the heap over slightly with straw, and in about five or six weeks you will have a fine heap of pure spawn to scatter over the newly made beds, so that less cake-made spawn will be required. If kept dry the above dropping spawn will keep good for six months or so.

I merely mention the above plan for the benefit of cottagers and those gardeners who are stinted in everything—men whose masters consider 5s. a deal for a bushel of spawn; which I have often proved in private service thirty years ago was worth £10 to them. Thirty years ago I knew one pottle or pound to realise 10s., and even now occasionally a pound sells for 5s. in Covent Garden Market.

The last guard against failure I have to mention is this:—After spawning the bed, chop up a brick or two of spawn into dust, and scatter it all over the surface of the bed—before moulding, of course. This plan gives the gardener a better chance of obtaining fine crops. So far as my own knowledge goes, I have not found over-spawning any preventive to having good crops. Too deep moulding I have found does not produce so fine a crop as shallow moulding. About two inches, when all is finished, is quite enough, provided the best or rich loam, &c., is used. Should the mould be light and sandy, I find that it is an excellent plan to scatter a little loam on the surface of the bed just before plastering it. This makes the mushrooms much more solid, with finer flavour. Our beds generally bear for three or four months, or more. Another great improvement is procuring road sand, when swept off by a broom, as the droppings are finely mixed with the sand, and the strength not taken from it by heavy rains, &c.

In the winter of 1864-5, although very severe, we were able to maintain a heat in the beds by the above-mentioned practice.

If the natural law of production of this most valuable vegetable be examined, how simple it is! At the end of August and during September the days are hot and the nights cool—the spawn runs rapidly, and quickly forms into mushrooms, in which process it is greatly assisted by moisture and dews. Let us therefore study Nature, and follow her laws.

A mushroom hawker I fell in with in Dulwich fields told me that the moon had much to do with the mushroom, but as yet I have never had to blame the moon.

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to poison
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*roof mortar, to make*

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